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BLOOD AND PLASMA IN SURGICAL EMERGENCIES*

F. A. SIMEONE, M.D.

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THE USE of blood and plasma has received extraordinary impetus in recent years, largely as the result of experiences in World War II and other catastrophies. During the War between the States, blood transfusion was used in only two cases.¹ One was a soldier from Massachusetts wounded on June 16, 1864. His convalescence was complicated by secondary hemorrhage, and he was given a transfusion of 2 ounces of blood obtained from the temporal artery of a healthy German. "Immediately after the injection a marked difference was noticed in the patient's pulse, which became stronger and firmer." The second transfusion was given to a soldier from Illinois wounded at Kearsaw Mountain on June 26, 1864. Again because of complications during convalescence, he was transfused slowly with 16 ounces of blood taken from a healthy man. The patient improved but died eventually, 9 days later, from secondary hemorrhage and dysentery. By contrast with this grand total of 18 ounces of blood used in 1864, it is interesting to note that during a one-year period toward the close of World War II, at least 70,000 pints of blood and an approximately equal number of units of plasma were used. Was the use of this large amount of blood and plasma merely the manifestation of a passing "fad" or was it truly justified? To approach an answer to this question, let us consider the indications for the administration of blood and plasma in typical surgical emergencies, namely, traumatic shock and severe burns:

*Presented at the John F. Kenney Annual Clinic of the Memorial Hospital Internes' Alumni Association, at Pawtucket, R. I., on October 29, 1947.

1. *The oligemia of traumatic shock.* During the past three decades, a classic monograph, three books, and a number of reviews have been written on traumatic shock and allied conditions. They bear witness to the importance of the problem and to the unsettled nature of the controversies about it. To consider in detail the various theories regarding the nature of traumatic shock or a classification of the different causes for the clinical state known as "shock" would take us too far afield. In brief, we should like to interpret the phenomena observed in shock as brought about primarily by a discrepancy between the capacity of the arterial tree and the volume of blood available to fill it effectively. Obviously, this discrepancy can be the effect of a number of different causes. Nevertheless, the basic fault, an absolute or relative oligemia, is common to all of them. In traumatic shock, our contention is that the discrepancy is brought about by actual loss of whole blood from the circulation either into serous-lined cavities, into the tissues, or onto the ground. Some of the evidence for this point of view is as follows:

a. *Wounded men can lose a large amount of blood and still survive.* Figure 1 illustrates the average amounts of blood lost by battle casualties from wounds in different locations. It should be emphasized that these are average figures and do not represent extremes. In general, patients with extremity wounds, and particularly those with compound fractures, lose more blood than do others (Figure 2).

The clinical manifestations of patients in shock are closely correlated with the amounts of blood that they have lost. Casualties in shock can be classified as to degree of severity by evaluating the changes that occur in the blood pressure, the pulse, the circulation of the skin, thirst, and the state of the sensorium.² The severity of the patient's re-

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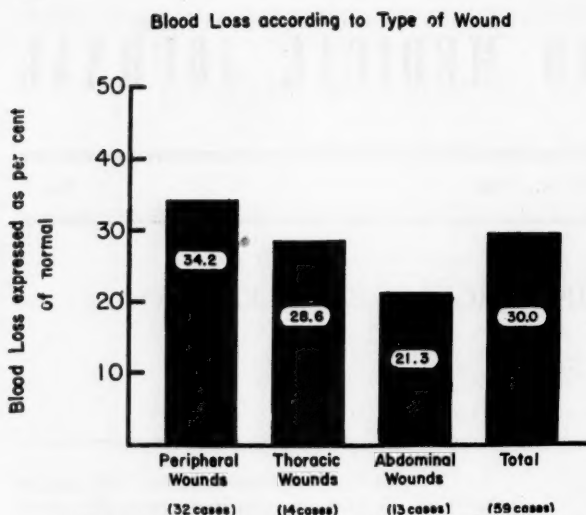


Figure 1. Blood Loss according to Type of Wound

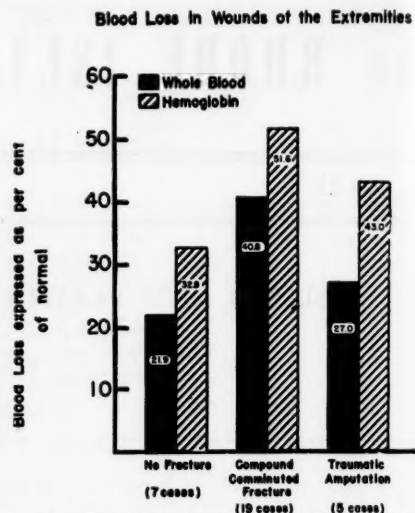


Figure 2. Blood Loss in Wounds of the Extremities

action to trauma, and therefore the severity of shock, can then be evaluated by taking a composite reckoning of all the observations. While at first glance it would appear that such a classification is neither reasonable nor practical, on second thought it does appear logical and did prove very useful for interpreting physiologic and biochemical changes that occur in the severely wounded. It must be emphasized, however, that the severity of shock cannot be estimated on the basis of any one single

observation, but rather on the basis of a composite of all the clinical observations taken together.

b. The degree of shock, as evaluated clinically, is closely related to the amount of blood lost. In spite of the fact that the degree of shock among the seriously wounded was estimated purely on clinical grounds, without reference to laboratory data, the amounts of blood lost by the wounded correlated very closely with the severity of shock based on the clinical manifestations (Figure 3). It is reasonable

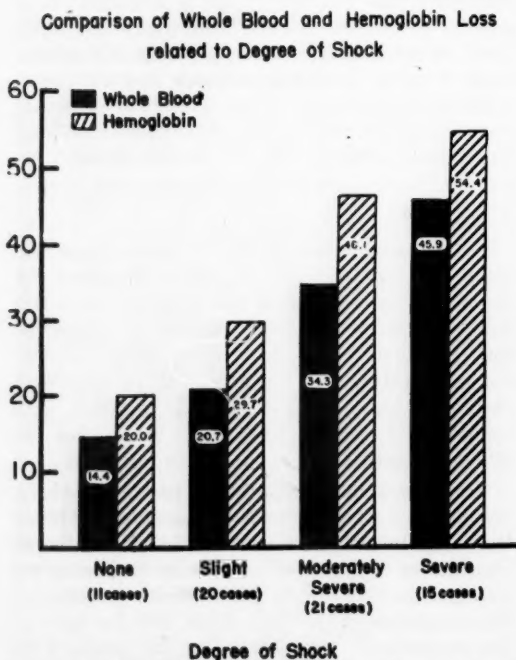


Figure 3. Comparison of Whole Blood and Hemoglobin Loss related to Degree of Shock

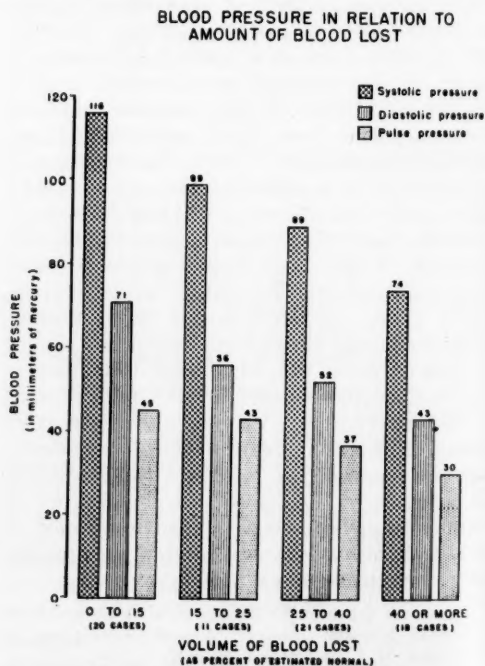


Figure 4. Blood Pressure in Relation to Amount of Blood Lost

to conclude that these manifestations are the results of blood loss and it should be possible to correct them by blood replacement.

c. *The blood pressure changes are closely related to amounts of blood lost.* Unlike the changes in pulse rate which showed no significant correlation with different amounts of blood lost, the systolic, diastolic and pulse pressures showed a progressive drop with increasing amounts of blood lost (Figure 4). A similar correlation was found between decreases in the systolic, diastolic and pulse pressures and increasing degrees of shock as evaluated clinically with reference to other criteria than the blood pressures alone. A falling blood pressure, then, an excellent guide for degree of shock, is primarily a function of blood loss in traumatic shock.

d. *The magnitudes of the physiologic changes in traumatic shock are closely related to the amounts of blood lost.* The function of the kidney is depressed in shock and there is some indication that the degree of depression increases with increasing severity of shock. Recovery of renal function is slow. Liver function is depressed, too, but in this instance a correlation with degree of shock or with amount of blood lost could not be made.² Hyperglycemia, thought to be related to activation of the sympathico-adrenal system, was correlated both with the degree of shock and with the amount of blood lost (Figure 5).

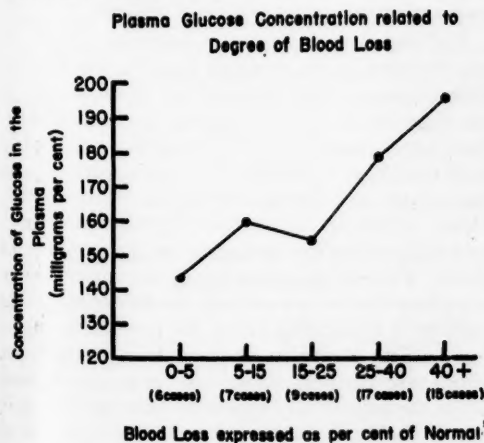


Figure 5. Plasma Glucose Concentration related to Degree of Blood Loss

These data lend strong support to the concept that traumatic shock is the consequence of a loss of blood from the circulation and that the severity of the phenomena observed is in direct proportion with the amount of blood lost.

2. *The need for blood replacement in traumatic shock.* When blood is lost from the circulation, the organization for physiologic homeostasis is brought

into play. The small vessels are contracted to accommodate the shrunken blood volume, the spleen contracts and expels a small volume of blood, however insignificant, into the general circulation, and the heart accelerates to make the most of what little blood reaches it. In addition, fluid is withdrawn from the tissues and into the circulation in an attempt to restore the circulating blood volume. Hemodilution results. Hemoconcentration does occur in the crush syndrome and in severe burns, but these are special situations. If after cessation of blood loss these physiologic mechanisms are sufficient to ensure an adequate circulation through vital organs, the patient survives and restores his plasma and blood cell volumes during the ensuing days. Otherwise, the vital organs fail because of lack of circulation through them, and the patient dies. Obviously, the latter eventuality can be prevented by replacing the lost blood entirely or at least in amounts sufficient to maintain an adequate circulation. Logically, whole blood should be used, for that is the fluid which is lost.

Another point should be made to emphasize the need for an aggressive policy of whole blood replacement in traumatic shock. It has already been pointed out that as the natural reaction to acute oligemia, fluid is withdrawn from the tissues into the circulation. (This fluid does not contain red cells but does contain protein. Hence the hematocrit value falls [hemodilution], but the concentration of plasma proteins is affected to a much less extent.) Figure 6 indicates that after a certain amount of blood has been lost from the circulation, the concentration of magnesium, an intracellular cation, rises in the plasma, suggesting that at that point the intracellular compartment is tapped for

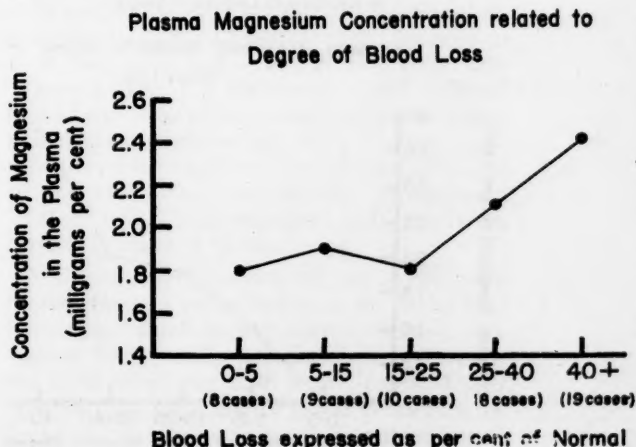


Figure 6. Plasma Magnesium Concentration related to Degree of Blood Loss

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fluid for the circulation. If this withdrawal of intracellular fluid continues, it is logical to assume that serious functional, and eventually structural, derangements might be produced in vital organs. A study of the severely wounded suggested that such is the case (Figures 7 and 8). The incidence of serious impairment of renal function was related to the degree of shock and to the amount of blood the casualties had lost.



Figure 7. Incidence of Renal Complications in Relation to Degree of Shock

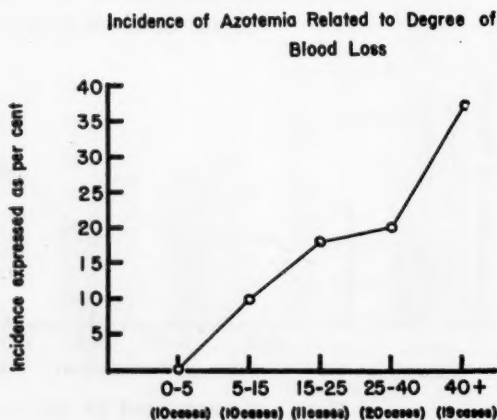


Figure 8. Incidence of Azotemia Related to Degree of Blood Loss

It is logical to ask, "How much of the lost blood is it necessary to replace?" Complex organisms, such as man, operate on an economy of abundance. We possess more blood than we actually need. A liter of blood can be dispensed with and its loss is scarcely noticed. While theoretically it would be ideal to restore the overabundance by complete blood replacement, it is not absolutely necessary and certainly not advisable to delay operation in order to accomplish that end.³ Pre-operative blood replacement can be considered adequate when the blood pressure is over 80 millimeters of mercury systolic, the pulse rate is dropping, the skin is warming, and circulation is returning in it. Blood replacement is continued during the operation, which itself may be considered, a part of resuscitation.³

When a patient in shock fails to respond to the administration of blood, something is wrong. Some have thrown up their hands and have attributed the phenomenon to the onset of a state of "irreversible shock". Whether such a state exists is debatable and is really a matter of definition. What is certain is that the condition must be rare, for when the cause of failure to respond to blood replacement is sought energetically, the cause is usually found to be continued hidden bleeding, continued peritoneal irritation from perforation of the gastro-intestinal tract, bronchial obstruction with atelectasis, fat embolism, clostridial myositis, and even such conditions as cerebral malaria.

3. *Blood versus plasma in traumatic shock.* A consideration of the evidence just presented leaves little question about the need for blood to correct the oligemia of traumatic shock. Crystalloid solutions were demonstrated to be ineffective as early as World War I. Solutions of gum acacia, pectin and gelatin have decided drawbacks and are of little value. Solutions of free hemoglobin have been tested, but they are dangerous in the presence of shock. Plasma has proved to be very useful as an expedient for it can correct the deficiency in the volume of circulating blood, the correction is lasting, and the condition of the patient is improved. There are dangers in its use, however, because while the patient may appear to have been brought out of shock, if transfused with large volumes of plasma alone, the uncorrected deficiency in circulating hemoglobin makes the patient a very poor risk for a surgical procedure or even for moving from a stretcher to an operating table. Plasma is an incomplete substitute for whole blood and should be used in traumatic shock only while whole blood is not available. Availability is plasma's great advantage. The same might be said of concentrated albumin. The ideal fluid for correcting the oligemia of traumatic shock is whole blood since that is what has been lost from the circulation.

4. *The oligemia of severe burns.* The shock encountered among patients who have incurred severe second and third degree burns has been classified into a category all its own: "burn shock". Actually, the fundamental feature is an oligemia, as it is in traumatic shock, but here the oligemia is a consequence not of whole blood loss, but primarily of plasma loss. Plasma leaves the circulation into blisters, into the dressings, and particularly into the surrounding tissues. Attempts have been made to prevent at least a part of this loss into the tissues by the application of pressure dressings. Pressure, however, is often difficult to apply and its efficacy has not been clearly determined. Cope and Moore⁴ have studied the changes in the distribution of body water in the burned patient and have applied the findings to the formulation of a rational schema for fluid therapy in the management of severe burns. The discussion below is based on the data from their study.

a. *Calculation of composition and amount of fluid lost from the circulation in patients with severe burns.* Except for a lower concentration of protein (approximately 4.0 grams per cent in burns), the composition of the fluid lost in burns approaches that of normal plasma. As one would expect, the amount of fluid lost into the tissues and from the surface of a severe burn varies with its extent. Burns involving less than 10% of the body surface are of little moment as far as fluid replacement is concerned. The requirements can usually be satisfied by an oral intake. With more extensive burns, proper management depends upon a careful estimate of the fluid lost from the surface of the wound and into the surrounding tissues. Measurements made from the open surfaces of burned areas suggest that in the course of 48 hours, two to six liters of fluid may be lost (cf. table 1). The composition

ESTIMATED LOSS OF FLUID FROM BURN SURFACE

Surface Area Involved (As Per Cent of Total)	Volume of Fluid Lost (Cubic Centimeters in 48 Hours)
25 - 35	1000
35 - 60	2000
60 and over	3000

Table 1. Estimated Loss of Fluid From Burn Surface

of this fluid is comparable to that of plasma except for the lower protein content. The fluid lost into the tissues can be considered as an expansion of the interstitial compartment of body water and can be measured fairly accurately by the dilution of thiocyanate or of radioactive sodium injected intravenously. Such measurements have indicated that a surprisingly large volume of plasma-like fluid is

transferred from the intravascular plasma compartment into the interstitial compartment. Again, as might be expected, the amount of this transfer of fluid can, within limits, be considered proportional to the extent of the burn. If the extent of the burn is less than 50% of the surface area of the body (table 2), the volume of fluid displaced may be calculated on the basis of a transfer out of circulation of 75 c.c. of plasma and 75 c.c. of physiologic saline in 48 hours for each per cent of surface area burned. For more extensive burns ("total burns"), the fluid lost into the extracellular space in 48 hours may be computed as 10% of the body weight. Besides this, fluid is lost from the burn surface as indicated in table 1. If the former is replaced as plasma the latter may be replaced as physiologic salt solution.

TABLE FOR ESTIMATION OF EXTENT OF SURFACE BURNED AREA
(After Berkow)

Region	Per Cent of Body Surface Involved
Head	6
Upper extremities:	
Both arms and forearms	13.5
Both hands	4.5
Total	18
Trunk:	
Anterior surface	20
Posterior surface	18
Total	38
Lower extremities:	
Both thighs	19
Both legs	13.6
Both feet	6.3
Total	38.9

Table 2. Table for Estimation of Extent of Surface Area Burned

In addition to the replacement necessitated directly by the burn, the normal fluid requirements of the individual, had he had no burn at all, must be kept in mind. For the urinary output, 1500 c.c. of fluid should be allowed daily and half of it may be in the form of physiologic saline. For the evaporation from the lungs and for both insensible and sensible fluid losses from the skin, an additional 1500 c.c. should be administered daily; this in the form of dextrose in distilled water.

b. *The time relationship of the loss of fluid from the circulation.* Careful studies of the loss of fluid from the circulation have shown that the loss is very rapid at first, but the rate decreases until by the end of 48 hours very little, if any, further loss is expected. For this reason, it is best to calculate the fluid requirement of a seriously burned patient on a 48 hour basis. The calculations are based upon the extent of surface area involved (table 3) for

continued on next page

ANTICIPATED FLUID REQUIREMENT IN SEVERE BURNS

(According to Proportion of Surface Area Burned)

Kind of Fluid	Expected Loss from Burn (10% of Surface Area) in 48 Hours	Normal Loss from Body (Adult) in 48 Hours		Total to Be Replaced in 48 Hours
		Kidneys	Other	
Water	.....	1500	3000	4500
Physiologic Electrolyte Fluid	1500*	1500	.....	3000
Plasma	1500*	.....	.....	1500
TOTAL	3000	3000	3000	9000

*Calculated for a 10% surface area burn on basis of 75 cc. for one per cent of body surface burned per day.

Table 3. Anticipated Fluid Requirement in Severe Burns (According to Proportion of Surface Area Burned)

burns of less than 50% of the surface area of the body. More extensive burns are better considered "total burns" in which the maximum loss possible is expected and the replacement is calculated according to body weight (table 4). The rate of replacement should parallel the expected rate of loss, so that 50% of the calculated fluid for replacement is administered in the first 12 hours, 75% of the total by the end of 24 hours, 87% by the end of 36 hours, and the total by 48 hours (Figure 9).

Fluid for expansion of the interstitial fluid compartment may no longer be required after the first 48 hours. As a matter of fact, beyond that time fluid is absorbed from the tissues and there is danger of hydraemic plethora, which, particularly in the elderly, may lead to fatal pulmonary edema. Parenteral fluid therapy should be limited, therefore, by the end of the second day, and the adequacy of therapy checked as described below.

ANTICIPATED FLUID REQUIREMENT IN SEVERE BURNS

(According to Expected Expansion of Interstitial Fluid Compartment in "Total Burns")

Kind of Fluid	Expected Loss from Burn in 48 Hours (Cubic Centimeters)	Normal Loss from Body (Adult) in 48 Hours (Cubic Centimeters)		Total to Be Replaced in 48 Hours (Cubic Centimeters)
		Kidneys	Other	
Water	.....	1500	3000	4500
Physiologic Electrolyte Fluid	2000**	1500	.....	3500
Plasma	7500*	.....	.....	7500
TOTAL	9500	3000	3000	15500

*Calculated for a 75 kgm. man, on basis of 10% of body weight.

**Calculated on basis of burn involving 50% of surface area.

Table 4. Anticipated Fluid Requirement in Severe Burns (According to Expected Expansion of Interstitial Fluid Compartment in "Total Burns")

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Diuresis during this phase normally rids the body of the excess water calculated to be necessary to prevent oligemia and shock during the first 48 hours.

It will be seen that the amounts of fluid recommended are surprisingly large in extensive burns, but necessarily so. It is often necessary to administer the fluid through more than one vein in order to keep up with the requirements. Whenever possible, fluid should be administered by mouth. The oral intake can be subtracted from the calculated fluid requirement, but not until effective absorption from the gastro-intestinal tract has been demonstrated by an effect upon the urinary output.

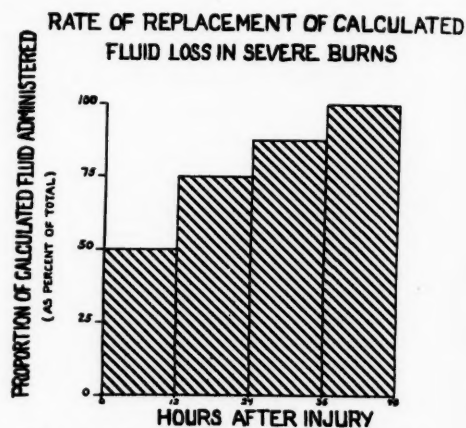


Figure 9. Rate of Replacement of Calculated Fluid Loss in Severe Burns

c. Evidence for adequacy of fluid replacement.

It is important to emphasize, that the estimates suggested for fluid replacement in severe burns are, at best, close approximations. They have been based on laboratory data and have withstood the test of clinical trial. However, since variations do occur in the fluid requirements from one case to the next it is important to have some check on the therapy. An excellent check on the adequacy of fluid therapy is the hourly measurement and charting of the urinary output through an indwelling catheter in the bladder.⁴ Such a chart is an excellent indicator of the adequacy of fluid replacement. If the urinary output is 40 to 80 c.c. per hour, the fluid intake may be considered adequate. If the output is greater than this, fluid administration may be curtailed. A progressive drop in the urinary output below this level and continued for 2 or 3 successive hours, warns the observer of impending oliguria and anuria.

d. The treatment of oliguria and anuria in burns.

In the kind of patient under discussion, two causes for oliguria and anuria have to be considered: first, the possibility that there is an insufficient amount

of body water available for the kidneys to excrete and second, that the kidneys have been damaged ("lower nephron nephrosis") and are unable to elaborate and excrete urine. It is all-important to distinguish between these possibilities because the treatment for one is the opposite of the treatment for the other.

The "water-tolerance" test⁴ was devised for this purpose. It is done very simply and without danger. Within a period of 30 or 40 minutes a liter of 5 per cent dextrose in distilled water is given intravenously and the effect of this upon the hourly urinary-output chart is noted. If the oliguria or anuria is the consequence of oligemia, or lack of available body water, there will be a prompt diuresis; if the failure of the urinary output is due to renal damage, however, there will be no diuresis in response to the rapid injection of the test solution. The test fluid need not be dextrose in distilled water. Review of what fluid the patient has already received may suggest that the test should be done with plasma (hemoconcentration and low plasma protein), or if the specific gravity and the chloride concentration of the urine are low, it may be preferable to inject dextrose in physiologic saline. As a rule, however, dextrose in distilled water is the most useful.

If the "water tolerance test" indicates dehydration, the rate of fluid replacement must be increased. With the basic requirements in mind, the absolute composition of the fluid administered can be varied according to the hematocrit and plasma protein values and to the specific gravity of the urine. If the test suggests that the oliguria is not the result of lack of available fluid for the kidneys, but rather the result of renal damage ("lower nephron nephrosis"), it is essential to curtail the administration of fluid. After the expected expansion of the interstitial fluid space is satisfied, no more fluid should be administered than to meet the losses that normally take place through evaporation and any other losses through abnormal channels (vomiting, diarrhea, exudation from extensive open wounds). Attempts to induce a diuresis in such patients by forcing fluids intravenously have led inevitably to death from pulmonary edema before the patient had a chance to die from azotemia. Diuretics have been ineffective.

e. The anemia of burns. Patients who have incurred deep extensive burns almost always develop a hypochromic anemia. The causes for this anemia are not entirely clear, but recent investigations have thrown light on the question (cf. Moore, Peacock, Blakely and Cope).⁵ The acute hemolysis and the immediate loss of red cells that occurs thereby in deep thermal burns is well recognized and is attributed to an increased red cell fragility,⁶

but this is a relatively minor matter, as far as the anemia is concerned, and does not account for the progressive anemia that these patients develop during the convalescence.

During the first week of convalescence, as already mentioned, much of the extravasated fluid is absorbed from the tissues and re-enters the circulation. This, in itself, leads to a lowering of the hemocrit value and gives the false impression of an anemia, a "pseudo-anemia", for the lowered hematocrit in this case does not indicate a decrease in the total red cell volume in the circulation. Treatment of this "pseudo-anemia" with whole blood could overload the circulation and cause fatal pulmonary edema. The diagnosis of this peculiar situation is made by surgical perspicacity or by the actual determination of circulating red cell volume by laboratory techniques.

Beyond this period of resorption of interstitial fluid, however, there is a true anemia which may be attributed to a combination of factors: chronic loss of small amounts of blood from large granulating wounds, depression of the bone marrow as the result of infection or other causes, and interference with the absorption and/or the proper metabolism and utilization of iron. Repeated whole blood transfusions are needed to correct this anemia and their use is essential to promote the healing of wounds in these patients and to decrease the frightful morbidity usually associated with serious burns.

COMMENTS

It is impossible to overemphasize the value of blood and plasma in surgical emergencies of which traumatic shock and severe burns have been taken as examples. Their use has undoubtedly saved countless lives during World War II and there is no doubt that they will continue to be most valuable adjuncts to surgical practice in the future. It is important to point out, however, that there is hardly any therapeutic agent, which is not attended by certain drawbacks. In the case of blood, tragedies have occurred from technical errors in the matching of blood, or when properly matched for the intended patient, there have been rare cases in which the blood has been given to a patient for whom it was not intended and of the wrong group. Fortunately, such complications are very rare, and they are mentioned only to emphasize the need for constant vigilance, with checks and re-checks, to be as certain as is humanly possible that the patient is receiving blood which has been accurately matched and which is intended for him. Particularly in women, and in all patients in whom a prolonged convalescence is foreseen, the matter of the Rh antigens must be carefully considered. There is danger in being too complacent of "universal

continued on next page

donor" blood. Such blood may contain a sufficiently high anti-A titer to cause serious reactions in an A recipient. The ideal universal donor blood is Rh-negative and has had its anti-A and anti-B agglutinins neutralized (Whitebsky's specific substances). To use such blood indiscriminately, however, is neither necessary nor practical. Type-specific blood with Rh reaction matching that of the patient is the safest and most practical blood to use in individual cases.

A word should be said about auto-transfusion. This is a useful procedure and the necessary apparatus should be readily available in every operating room. The blood shed in the peritoneal cavity can be easily aspirated and re-injected into the patient. Blood for this purpose has been successfully collected from the vagina in massive metrorrhagia. It has been used even when contaminated with intestinal contents, though not by choice. In general, it should not be used when pus is present or when the blood is already clotted.

There is danger in administering too much citrate with blood transfusions in patients who show evidences of liver damage and impairment of renal function (as in toxemia of pregnancy). In such instances, if more than 2 liters of blood are administered, impairment of the clotting mechanism may occur as the result of the injected citrate which is not metabolized promptly, as it is normally.

There are certain dangers in the use of plasma. Especially on using plasma that has been pooled from a large number of donors, the incidence of homologous serum jaundice should be kept in mind as a definite hazard to weigh against the possible benefits from plasma administration. The indications for the use of plasma should be limited to the replacement of lost blood while waiting for whole blood, and to instances where there has been obvious loss of plasma (burns). To use plasma for replenishing serum protein, or for fulfilling the daily protein requirements of a patient is hazardous, impractical, and ineffective. To administer 120 grams of protein would require 2 liters of plasma, and there are better ways to accomplish that end. Neither blood nor plasma should be used when the benefit to be derived therefrom does not outweigh the calculated hazard from their use.

SUMMARY

1. Blood and plasma are indispensable agents for restoring the circulating blood volume when this is dangerously decreased in surgical emergencies.

2. In traumatic shock, whole blood is lost from the circulation and whole blood should be used for replacement.

3. In burns, plasma is lost from the circulation and plasma is indicated for restoration of the circulating blood volume during the period of expansion of the extra-cellular fluid space.

4. The necessity of a careful check on fluid replacement in severe burns is emphasized and the use of the "water tolerance test" is described.

5. Whole blood is necessary to treat the anemia which is encountered both early and late during convalescence from a severe burn.

6. It is emphasized that the administration of blood and plasma is not without its hazards and whereas these are life-saving agents they must be used with great care and good judgment.

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AN INVITATION IS EXTENDED

All members of the Society are invited to attend the meeting of the St. Joseph's Hospital Staff at the Nurses' Auditorium on Tuesday, May 25, at 9 p.m. when Dr. Edward G. Waters of New York will present a paper on "Common Ovarian Tumors as Factors in Sterility and Pregnancy."

Dr. Waters is assistant clinical professor of obstetrics and gynecology at Columbia, and he is also division chief of obstetrics at the Margaret Hague Maternity Hospital in Jersey City.

Physicians planning to attend this lecture should inform the Record Office at the hospital in order that arrangements may be made for the serving of the collation following the meeting.

FRACTURES OF THE SHAFT OF THE TIBIA*

Types and Treatment (Bone Grafts and Non-Union)

ROBERT T. HENRY, M.D., F.A.C.S.

The Author, Robert T. Henry, M.D., of Pawtucket, R. I. Chief, Orthopedic Service, The Memorial Hospital, Pawtucket, R. I.

WE, of the Orthopedic service, desire to present for your approval a discussion of one of the problems that confronts us in our daily ward service, namely, the treatment of fractures of the shaft of the leg bones, particularly of the tibial shaft with special reference to the phase of delayed and non union with remedial bone grafting.

In this highly industrialized community we have an opportunity to treat a great many fractures of the lower extremities. We consider fractures of the shafts of leg bones to be important for the following reasons:

1. The large number of compound and infected fractures,
2. The tendency of oblique and spiral fractures to slip,
3. The disability attendant on poor alignment or rotation of the fragments which disturbs the normal line of weight bearing and makes for painful residuals,
4. The frequency of slow union due primarily in most cases to the poor blood supply of the bone at this level,
5. The possibility of non union if slow union is not recognized or if immobilization is not sufficiently prolonged.

Fractures of the shaft of the Fibula usually cause no functional incapacity as the shaft of this bone bears no weight and serves mainly for muscular attachments.

Transverse fractures of the tibial shaft in which there is sufficient end bearing surfaces to allow for satisfactory alignment can usually be immediately manipulated, reduced and immobilized in plaster. This method of immediate reduction and casting has likewise proven advantageous in treating some spiral and oblique graft fractures. If the alignment has not been completely satisfactory we have occasionally been able to correct it by wedging the cast.

*Presented at the John F. Kenney Annual Clinic of The Memorial Hospital Internes' Alumni Association, at Pawtucket, R. I., on October 29, 1947.

Most spiral and oblique fractures occur as the result of torsion and it is not unusual to see the fragments tapering off to a sharp peak. The Gastrocnemius and Soleus muscles play a great part in distracting and displacing the fragments since the Soleus is attached below the knee and the Gastrocnemius is attached to the lower end of the Femur posteriorly. Most oblique fractures tend to displace upward. They respond well to treatment by skeletal traction with the pin or wire placed through the Os Calcis. The pin or wire may, if desired, be passed through the Tibia and Fibula above the ankle joint but the Os Calcis method is easier of application and in our opinion more satisfactory. Suspension of the leg in a Thomas splint facilitates traction and makes for the comfort of the patient. Traction is usually continued until the fracture is in satisfactory alignment by X-ray examination and clinically "sticky" enough to allow for further immobilization in plaster without danger of slipping.

The treatment of slowly uniting fractures of the tibial shaft is a much discussed problem. It is often most difficult to draw any sharp line of distinction at the point at which slow or delayed union actually becomes non union. We have no hard and fast rule at this hospital. Each case must be decided on individual merit and circumstance. When, from clinical and X-ray evidence the decision is made that the fracture is not healing properly, we do not hesitate to operate the fracture and have successfully used bone grafts, usually of the inlay type, to accelerate callus formation as well as to internally splint and immobilize the fracture.

The repair of fractures and the rate of union is determined to a great degree by the vitality and vascularity of the fragments. If the blood supply is free, union is fairly rapid. If the blood supply is cut off or impaired, union may show varying degrees of slowness. The blood supply of normal bone is derived not only from a main vessel but from many other vessels entering the cortex from the capsule, ligament and tendon attachments. The ends of bones show many vascular openings which explains why fractures of the bony extremities heal fairly rapidly. This is true of fractures in the shoulder area, wrist joint, knee joint and ankle

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region. On the contrary shafts of bones may be completely devoid of vascular foramina. This is especially true of the shaft of the Tibia which depends mainly for its blood supply on the nutrient artery. Fracture of the tibial shaft may cut off this sole-source of blood supply so that the vitality and viability of the lower fragment is impaired. Sometimes the distal fragment becomes almost exsanguinated and this impoverishment contributes greatly to slow union and non union. If the distal fragment becomes avascular and inert it is thereby unable to take part in the process of repair. This type of dense dead bone can often be demonstrated by X-Ray. It takes a long time for the upper living fragment to promote tissue growth to invade and replace the devitalized lower fragment. However, the dictates of the calendar should not be accepted as evidence of non union or slow union. A delay of a few weeks or months does not necessarily mean that the fracture will ultimately fail to unite.

Theoretically at least we must consider three stages during the healing process when slow or delayed union can be evaluated.

1. If the fracture line is still visible without undue separation of the fragments, if there is no cavitation of the opposing surfaces, no decalcification and no sclerosis, union is said to be slow. At this stage the fracture is not considered as an ununited fracture and it still may unite if it is immobilized long enough.
2. If by disturbing the traction or by changing of casts or other causes of motion causes the fracture line to become widened to the point of cavitation and the area becomes fuzzy and ill defined without recalcification or sclerosis, repair is not yet complete. At this stage the gap between the fragments is filled with granulation tissue not scar tissue. This is usually accepted as evidence of delayed union and the fracture must be further immobilized until the gap becomes recalcified and solid union takes place, which may require many months.
3. When the gap between the fragments is only partially filled, the margins well defined and the fracture surface relatively smooth and actual sclerosis has occurred, then non union is fairly well established and the third stage in the slow union, delayed union, non union triad

has been ultimately reached. At this point the fragments are held by thick scar tissue and a false joint often develops within the cicatrix. It then becomes necessary to remove the scar tissue and dead bone and reconstruct the conditions of a fresh fracture if union is to be obtained. We feel that this procedure is best accomplished by bone grafting because in cutting a bed for the graft the dead and sclerosed bone is effectively removed. Mere open reduction and/or plating is not adequate treatment, a bone graft is required. It not only stimulates the growth of new bone but it also provides excellent internal fixation.

Often fractures of the tibial shaft may be adequately and accurately reduced but they show little bony union after immobilization for months. Most fractures elsewhere which exhibit signs of slow or delayed union will usually eventually unite if immobilized for the necessary period and held long enough. But the length of time consumed in tibial fractures, especially in this industrial country where the time element and the economic situation are major factors, together with the unfairness in handicapping a patient, particularly an elderly one, to the long months of inactivity required for prolonged immobilization makes internal fixation preferable. Therefore, a bone grafting operation may be done in the early months as a time saver. This procedure has become less hazardous due to developments in chemotherapy and antibiotics.

It should be emphasized that plating of itself will not accelerate bony union. An autogenous living graft is preferable for the stimulation of laying down of new bone. We know from histological studies that the graft eventually undergoes erosion and is invaded by granulation tissue and ultimately is entirely replaced by new bone. Consequently, if a living graft is capable of this stimulation of the laying down of new bone in addition to providing an adequate method of internally fixing the fracture, we feel that such operative methods justify themselves. Bone grafted fractures usually heal well and unite solidly.

In the remaining time at our disposal we would like to offer some evidence of our clinical efforts and demonstrate by X-Ray films some of the points discussed in this paper.

DISCUSSION

JOHN H. GORDON, M.D., *Member, Visiting Staff, The Memorial Hospital*

WE WOULD now like to present cases with x-ray films illustrating some of the points that Dr. Henry has brought out in his paper.

Case No. 1. G.S. No. 83238

This fifty-seven year old white male was admitted to the hospital December 10, 1946. While

at work a bale of wool fell on his right lower leg and he suffered an oblique comminuted fracture of the lower third of the right tibia with an associated fracture of the fibula. The admission x-ray films show the fracture with posterior angulation and little if any over riding. He was treated by manipulation and application of a plaster cast from toes to groin. X-rays taken December 13, 1946 show the position after manipulation with marked posterior and lateral angulation. It was felt that wedging of the cast might correct this angulation and on December 15, 1946 the procedure was carried out. X-rays taken the following day now show the fragments to be in satisfactory position and alignment. January 12, 1947 x-rays were taken which showed the fragments to have retained their former position and on that day he was discharged from the hospital walking with crutches. The last x-rays taken April 9, 1947 show the fractures to be healed. He was then walking without a limp and had no symptoms with reference to his right leg.

Case No. 2. W.G. No. 79980

The next set of x-ray films to be shown are those of a twenty-eight year old white male who was admitted to the hospital October 14, 1945 following an automobile accident. He had a compound fracture of the left tibia through the middle third with a fractured fibula at a slightly higher level. The admission x-rays show the fracture with slight lateral displacement of the distal tibial fragment. An open reduction was done and the tibial fragments were held by a chromic catgut suture through drill holes. A plaster cast from toes to groin was then applied. The next x-rays shown were taken October 31, 1945. The cast had been wedged to correct some anterior angulation. The position and alignment was now considered satisfactory. This position was maintained in plaster casts. On June 3, 1946 the x-ray shown was taken. There is no evidence of callus formation at the site of the tibial fracture. Clinically there was no evidence of union and it was decided to do a bone grafting operation. This was done July 10, 1946. The procedure used was the sliding bone graft and the next x-rays show the graft in place and the fragments of the tibia to be in good alignment. These were taken July 15, 1946. The leg was kept in plaster until January, 1947 when by x-ray and clinically he had union. The last x-rays taken June 9, 1947 show bony union through the site of fracture.

Case No. 3. A.B. No. 79488

These x-ray films are of a thirty-nine year old white male who was admitted to the hospital June 14, 1946. He tripped over a lift while at work and fell injuring his right lower leg. The admission diagnosis was a compound fracture of the right tibia, middle third and a fracture of the right fibula.

The admission x-rays show the medial displacement of the distal tibial fragment and the slightly oblique nature of the fracture. Because of the marked swelling of the leg this case was treated by Kirschner wire traction. The wire being placed through the os calcis and the leg held in a Thomas splint. The second x-rays taken June 24, 1946 show the fragments pulled down to length. There is still slight medial displacement of the distal fragment. The traction was continued and the next x-rays, taken August 9, 1946 show no evidence of callus formation. The fracture was then eight weeks old and it was felt that union would more surely be obtained if a bone grafting operation were done. On August 14, 1946 a sliding bone graft operation was carried out. At operation muscle tissue was found between the fragments. The next x-rays were taken September 25, 1946 and show the bone graft in place and the fragments in good position and alignment. Plaster fixation was maintained until union was obtained. The last x-rays taken July 11, 1947 show the fracture to be healed in excellent position and alignment.

Case No. 4. J.M. No. 76940

The next films are those of a forty-eight year old white male who was admitted to the hospital January 4, 1946. He had been struck by an automobile and had a compound fracture of the left tibia, lower third and a fractured fibula. The admission x-rays show lateral displacement of the distal tibial fragment with slight overriding. An open reduction was done followed by a plaster cast from toes to groin. The next x-rays taken January 5, 1946 show posterior displacement of the distal fragment. This position was considered satisfactory. On February 26, 1946 the cast was bivalved and x-rays were taken with the plaster removed. These x-rays show no evidence of callus formation. Clinically there was no evidence of union. It was decided that a bone grafting operation should be done in order to stimulate callus formation and also to improve the position. Kirschner wire traction was applied to attempt to overcome the shortening. No definite gain was made and on March 27, 1946 an open reduction with a sliding bone graft was done. The next x-rays, taken April 4, 1946, show the bone graft in place crossing the fracture line. The shortening has been corrected. The leg was held in a plaster cast from toes to groin until union was obtained. The last x-rays were taken March 4, 1947 and show bony union across the fracture site.

Case No. 5. E.G. No. 84424

The last set of films to be shown are those of a thirty-four year old man who slipped and fell injuring his right lower leg. He was admitted to the hospital February 15, 1947 with an oblique fracture of the tibia four inches above the ankle and a frac-

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SUBACUTE BACTERIAL ENDOCARDITIS*

Report of a Case Treated Successfully with Penicillin

The Author. *Jacob Greenstein, M.D., of Providence. Chief, Medical Service, The Memorial Hospital, Pawtucket, R. I.*

BEFORE the advent of the "Sulfonamides", the prognosis in Subacute Bacterial Endocarditis was practically hopeless. Following the use of these newer chemotherapeutic agents, there were some reports of clinical cures, but in the majority of instances these proved to be only temporary remissions with ultimately fatal outcomes. With the use of Penicillin, however, the outlook in this disease has become much more hopeful and a clinical cure can be expected in a large percentage of cases, especially when they are due to Penicillin sensitive strains of streptococcus viridans, if treated with adequate dosages for a sufficiently long period of time.

The following is a report of a case of Subacute Bacterial Endocarditis due to streptococcus viridans, twenty-eight months after successful treatment with Penicillin.

(Miss A.D.) a 27 year old dietitian's helper was admitted to this hospital on December 13, 1944 complaining of chills, fever, general malaise, and aching finger tips, of three weeks duration.

The patient had been in fairly good health most of her life and except for having known that she had a heart murmur since early childhood, which gave her no trouble, she had had no previous illnesses, accidents or operations. She did not recall having had Rheumatic Fever and had had only occasional sore throats.

(Present illness)—Approximately three weeks before admission, she began to have chills, fever, general malaise, and what she described as painful "plugs" in her finger tips. She was treated at home with 1 gram of "Sulfa" every four hours but her chills, fever, and general malaise persisted and she was transferred to the hospital for further observation.

On admission the physical examination revealed a well developed, fairly well nourished white fe-

male, extremely nervous and apprehensive, who appeared only moderately ill. Temperature—102.4 degrees, Pulse—150, Respirations—30, Blood pressure—120/80.

The only positive findings were a slightly reddened throat, some "splinter hemorrhages" in the finger tips, and a grade II systolic murmur over the mitral area. The heart was not enlarged, the sounds were of good quality, and the rhythm was regular. Electrocardiographic findings were within normal limits. The lungs were clear and resonant with vesicular breathing throughout.

Laboratory findings were—

R.B.C.—4,900,000

Hgb.—11.5 gms.

W.B.C.—13,000

Differential—89% Polys. 11% Lymphs.

Blood urea nitrogen—11.2 mg. per 100 c.c.

Blood sugar—82 mgs. per 100 c.c.

Urine—negative

Wassermann—negative

Blood cultures taken on the day of admission and five days later were positive for streptococcus viridans.

The diagnosis made was Rheumatic Heart Disease, Mitral Insufficiency, and Subacute Bacterial Endocarditis.

She was given 20,000 units of Penicillin intramuscularly every four hours for sixteen days, a total of 1,920,000 units from December 21, 1944 to January 6, 1945, during which time her temperature remained normal and she felt much improved.

Two days after the Penicillin was discontinued, she again began to have an afternoon rise in temperature (to approximately 101 degrees) with associated general malaise which continued with no significant improvement to the time of her discharge on January 24, 1945.

During this admission she was treated on the private ward and the discharge note recorded that the patient's family objected to her continued stay in the hospital and to further Penicillin treatment because of the expense involved. She was advised that she should return to the hospital for further treatment if the symptoms persisted.

*Presented at the John F. Kenney Annual Clinic of the Memorial Hospital Internes' Alumni Association, at Pawtucket, R. I., on October 29, 1947.

* Now thirty-five months.

She was readmitted on February 27, 1945, approximately one month later stating that since she had left the hospital she had been confined to bed and had continued to have a low grade fever, general malaise, and recurrence of "plugs" in her fingers and toes.

The examiner noted "that she had lost some ground, and that her heart murmur had increased in intensity, and that she also showed "splinter hemorrhages" (emboli) in her fingers and toes and some sub-conjunctival petechiae". Temperature—102 degrees, Pulse—140, Respirations—24. Laboratory findings were—

R.B.C.—3,900,000

Hgb.—9.5 gms.

W.B.C.—10,250

Differential—83% Polys. 17% Lymphs.

Urine—negative

Blood cultures taken on the day of admission were reported positive for streptococcus viridans.

She was given 20,000 units of Penicillin intramuscularly every four hours for eight days, a total of 960,000 units from February 27, to March 7, 1945, during which time her temperature became normal, her blood cultures became negative, and she was symptomatically improved. The day after the Penicillin was discontinued, she had a recurrence of temperature which continued to spike to 102 degrees and the blood culture again became positive. Two other courses of treatment with Penicillin 20,000 units every two hours from March 22, to March 31, 1945 and from April 26, to May 11, 1945 gave similar results with clinical improvement and negative blood cultures during treatment and a return of symptoms with positive blood cultures on discontinuance of Penicillin therapy.

During this admission of approximately three months, she had three courses of Penicillin of eight, nine and fifteen days respectively, following which she showed clinical improvement with negative blood cultures and on each occasion a return of symptoms with positive blood cultures when the Penicillin was discontinued. In all she received 6,720,000 Units of Penicillin.

She was discharged on May 24, 1945, 13 days after her last course of Penicillin treatment during which time she appeared clinically improved and her temperature remained normal. However, a blood culture taken on the day of discharge was subsequently reported positive for streptococcus viridans.

She was readmitted four weeks later, on June 13, 1945, with the story that she had been in bed since her last discharge. Her fever and malaise had returned, she had become progressively weaker, and she had again begun to have "plugs" (emboli) in her fingers and toes.

Physical examination showed that she had lost considerable ground. She was poorly nourished and appeared chronically and desperately ill. There was an increase in her pallor. Her cardiac murmur had become much louder. Her spleen was palpably enlarged and she showed embolic phenomena in her fingers, toes, and subconjunctivae. Temperature—102 degrees, Pulse—140, Respirations—22, Blood pressure—100/70.

Laboratory findings were—

R.B.C.—3,100,000

Hgb.—9.4 gms.

W.B.C.—13,000

Differential—76% Polys. 24% Lymphs.

Blood cultures taken on the day of admission were again positive for streptococcus viridans.

A review of her previous admissions suggested that Penicillin was beneficial in suppressing the organism and it was felt that larger doses for a longer period of time should be tried in an attempt to obtain a clinical cure.

She was started on 250,000 units of Penicillin every sixteen hours by slow intravenous drip in 1000 c.c. of normal saline alternately with 5% glucose; and 50,000 units of Penicillin intramuscularly every two hours when the intravenous was not running. (total 6,555,000 units)

Sensitivity tests showed the organism to be inhibited by .03125 oxford units per c.c. Blood titration during intravenous administration showed a constant level of 0.25 oxford units of Penicillin per c.c. and during intramuscular administration, a level of 1. unit per c.c. at the end of thirty minutes, .25 unit per c.c. at the end of sixty minutes, .125 unit per c.c. at the end of ninety minutes, and .0625 unit per c.c., or approximately twice the inhibiting level of the organism, at the end of two hours.

The Penicillin was given intravenously for seventeen days, at the end of which time she absolutely refused to have any further intravenous treatment. Therapy was continued for ten more days with 50,000 units of Penicillin intramuscularly every two hours. (6,000,000) The total amount of Penicillin given in twenty-seven days was 12,555,000 units.

On the third day she developed a sudden sharp pain in the left upper quadrant of the abdomen associated with mild shock, muscle spasm, and tenderness over the spleen which was interpreted as a splenic infarction. Except for this incident, she began to show progressive clinical improvement, and her temperature remained normal for the rest of her hospital stay. Weekly blood cultures were negative and she was discharged as improved on July 13, 1945, four weeks after admission.

It is now twenty-eight months* since her last hospital admission. She returned to work two

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months after her discharge and has worked regularly since that time. Except for three minor upper respiratory infections, during which she was given prophylactically 600,000 units of Penicillin in oil and beeswax in twenty-four hours, she has remained perfectly well.

All blood cultures taken at approximately monthly intervals since her discharge have remained consistently negative and we feel that we have achieved a clinical cure.

Although this report represents only a single

case, the conclusions drawn from our experiences are parallel to those drawn by others who have had an opportunity to observe relatively larger series of cases, namely that the outlook in Subacute Bacterial Endocarditis due to Penicillin sensitive strains of streptococcus viridans is now quite hopeful and a clinical cure can be expected in a large percentage of cases if adequate blood concentrations of Penicillin are maintained for sufficiently long periods of time.

	1	2	3
Admissions	12/13/44—1/24/45	2/27 — 5/24/45	6/13 — 7/13/45
Basic lesion	Rheumatic mitral insufficiency	Rheumatic mitral insufficiency	Rheumatic mitral insufficiency
Blood cultures	Strep viridans	Strep. viridans	Strep. viridans
Embollic phenomena	Finger tips	Finger tips Toes Subconjunctivae	Spleen Finger tips Toes Subconjunctivae
Treatment Penicillin — oxford units	20,000 i/m q4h 16d (1,920,000)	20,000 i/m q4h 8d (960,000) 20,000 i/m q2h 9d (2,160,000) 20,000 i/m q2h 15d (3,600,000)	250,000 i/v q16h 50,000 i/m q2h when i/v not running (6,555,000)—17d 50,000 i/m q2h 10d (6,000,000)
Total	1,920,000 units	6,720,000 units	12,555,000 units
Sensitivity of organism — Inhibited by oxford units/c.c.			0.03125 U/c.c.
Blood titration Penicillin level			0.25 U/c.c.
Cont Intravenous			
Intramuscular			1. —30 min. 0.25 —60 min. 0.125 —90 min. 0.0625 —2 hrs.
Sequellae	Relapse	Relapse	Recovered 28 mos. plus

DISCUSSION

RAYMOND W. YOUNG, PH.D., *Bacteriologist, Rhode Island Hospital*

AN INTERESTING OBSERVATION in the reported case is the fact that the etiologic organism, *Streptococcus viridans*, did not develop resistance to penicillin. At the time, penicillin was not as available nor as cheap as it is now, and conse-

quently it would seem that an adequate amount of the antibiotic was not given initially nor maintained; this apparently accounts for the three relapses. It is well-known that such a condition favors the development of resistance on the part of

the organism toward the antibiotic, and *Streptococcus viridans* is particularly prone to adapt itself to the adverse effect of the antibiotic. I have in mind two other cases of the same etiology which followed a similar course with relapses after apparent recovery; however, with each relapse a much increased dosage of penicillin was required to effect any beneficial response. The sensitivity titre of the organisms in each case showed increasing resistance until a point was reached where penicillin gave no response and both patients eventually died. Therefore in the case presented it is remarkable that the sensitivity titre of the organism, which was very low at 0.03U/c.c., remained unaltered after the three relapses and showed no therapeutic indication of increased resistance, even though conditions were ideal for that to occur.

The clinical reports in the literature point out the importance of knowing the sensitivity of an organism in order to know whether or not penicillin therapy will be of any avail. The organisms which are involved in subacute bacterial endocarditis do not have a uniform penicillin sensitivity titre. The more common viridans type, *Streptococcus mitis*, the common throat alpha strep, occurring in about 50% of the cases of subacute endocarditis, usually has a low sensitivity titre between 0.05 and 0.55U/c.c., but occasionally up to 5 or 10 or more units/c.c. Recently a distinct species of alpha streptococci has been described, having biochemical and cultural characteristics uncommon to any of the other streptococci and occurring only in subacute bacterial endocarditis, so that it is called tentatively *Streptococcus s.b.e.* The organism occurs in a large percentage of cases reported, from 30-40%. It resists therapy to a greater degree than the common mitis viridans type and represents one of the few instances where there is poor correlation between in vitro sensitivity and in vivo therapeutic response. Cases have been reported where this organism showed low sensitivity titre but poor therapeutic response unless dosage of penicillin was greatly increased and maintained. No explanation is offered for the discrepancy, but it may be related to the nature of the lesion produced by this particular species. The lesion may provide a better mechanical barrier effect preventing adequate contact between organism and antibiotic. In several cases reported in the literature where *Streptococcus s.b.e.* showed even a mild degree of resistance initially, in terms of sensitivity titre, large amounts of penicillin had no influence on the course of the infection. The enterococcus group of alpha streptococci occurring in subacute bacterial endocarditis are often very resistant with a sensitivity titre as high as 250-500U/c.c., in which case penicillin therapy of course, would be of no avail. The remaining miscellaneous alpha streptococci occurring in this in-

fection, such as *Streptococcus bovis* and *Streptococcus agalactiae* and other less commonly occurring species usually fall within the range of sensitivity required for effective therapy, that is between 0.05U up to 5U/c.c.

I will comment briefly on dosage and maintenance as related to the sensitivity of the organism. A positive blood culture should be obtained repeatedly, at least twice in order to rule out the possibility of contamination, the organism tested for sensitivity and a blood level of around 4-5 times the sensitivity titre, or the amount required to inhibit the organism, maintained for at least 4 weeks, but longer as indicated. Effective response should render the blood sterile within three days. If this does not occur, the dosage should be increased accordingly. Studies have indicated that a blood penicillin level of 1U/c.c. can be maintained for each million units given daily. The sensitivity titre of most alpha streptococci occurring in subacute bacterial endocarditis usually falls between 0.05 and 0.55U/c.c., but occasionally up to 5U/c.c. With that sensitivity range, 0.5 million units/day for 4 weeks at least is indicated. With *Streptococcus s.b.e.* or other more resistant species or strains, 2 to 3 million units/day for at least 4 weeks is indicated. If the blood culture is not sterile within 3 days, the dosage should increase to at least 2 million units/day. Clinical reports showing effective response, apparent recovery, indicate an average total dosage of around 50 million units given over a period of 4-5 weeks.

The matter of discrepancy between vitro sensitivity and therapeutic response or in vivo sensitivity seems to concern a number of clinicians. Generally speaking, there is excellent correlation between in vitro and in vivo sensitivity. In other words, if an organism is shown to have a low sensitivity titre it should respond to adequate therapy which will allow at least the inhibiting concentration in the tissues. Where there is poor correlation, a few possible explanations may be offered:

1. The lesions may be too advanced, too extensive for any hope of favorable effect.
2. The lesion may be protecting the organism from the circulating antibiotic, walled off and providing a mechanical barrier effect, so that there is inadequate contact between organism and antibiotic.
3. The organism may be developing resistance because of inadequate dosage, and more rarely in spite of adequate dosage.
4. In a few instances it has been shown that where there is a great difference between the bacteriostatic sensitivity titre and the bactericidal sensitivity titre of an organism, there may be poor therapeutic response even though the organism shows a low inhibiting sensitivity titre.

The RHODE ISLAND MEDICAL JOURNAL

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CRAWFORD ALLEN HOSPITAL

FOR THE PAST few years the state of Rhode Island Rheumatic Fever program has enjoyed the facilities of the Crawford Allen Hospital as a convalescent home. During the past winter the experiment of moving the convalescent patients to the Rhode Island Hospital has been tried. This was done because of convenience to attending physicians and to secure a close association with the Rhode Island Hospital as a medical center.

At the present moment there are grave doubts as to the feasibility of opening the Crawford Allen Hospital as a convalescent home for the coming summer. The hospital depends for its revenue upon state of Rhode Island rheumatic fever funds and payments by individuals for hospital care. Owing to the present diminution of the number of cases requiring hospitalization the income necessary to open Crawford Allen seems not available.

The rheumatic fever program conducted by the state and the Children's Heart Association of Rhode Island should not be given up. Children suffering from this affliction must not be neglected. It is indeed gratifying to note the decreasing incidence of this scourge of childhood but there still are children who need hospital care for rheumatic fever and there is no means by which we can fore-

tell whether or not there will be an increase in the number of cases in the next year or two. This disease is endemic like other contagious diseases and we must be prepared for future outbreaks. The program as instituted has been most satisfactory and many rheumatic children have benefited.

A hospital must have a definite number of patients to pay the overhead charges. Can we find other means in the interim between outbreaks of rheumatic fever to breach the period of diminishing hospital revenue? Between forty and forty-five patients are needed to insure the opening of Crawford Allen Hospital. The hospital has accommodations for fifty patients.

Certainly there is no reason why other than rheumatics could not be sent to the hospital to help pay the necessary expenses of conducting this most essential hospital unit. Children with other conditions of a debilitating nature would profit by a stay at this delightful spot on Narragansett Bay. Crawford Allen Hospital under the leadership of Dr. Murray S. Danforth was designed for the care of orthopedic cases but with the disappearance of tuberculous bone disease this need no longer exists, but there must be other types of orthopedic conditions which would be benefited by a stay at Craw-

ford Allen. These children could be housed in other than the rheumatic fever wards should there be any feeling concerning the contact with rheumatic fever cases.

Crawford Allen Hospital offers excellent recreational opportunities including a bathing beach far removed from contamination of water in the upper bay. There are playground facilities. Here may be studied the environment from which the child comes and to which it must return and an interpretation made of the child's needs and capacity. Here are opportunities for occupational therapy and the freedom of life in such a place is of benefit to a child.

If physicians throughout the state would keep this matter in mind and realize the importance of not giving up the rheumatic fever program we might be able to find a goodly number of children non-rheumatic who would profit by a stay in the country in which Crawford Allen Hospital is located.

PSYCHOSOMATIC SHIFT

Our outgoing and incoming Presidents of the Rhode Island Medical Society by the nature of their daily work span the entire extent of modern medicine's art and science.

Dr. Ruggles with his head in the clouds of psychic phenomena (or at least on a level with them so that he realizes vividly their stormy disturbances) relinquishes his office to Dr. O'Connell, at home deep in the body handling routinely its most material manifestations as gall stones or bowel cancer.

Possibly Dr. Ruggles would claim the broader experience. There was a time when he demonstrated his ability to diagnose appendicitis and remove the offending vestigial organ. We doubt if Dr. O'Connell would ever dogmatize over schizophrenia or the proper handling of a maniacal patient.

In the past the gamut has been run from skin to bones but never more abrupt change has occurred.

It expresses figuratively the modern conception that our thoughts and our bodily functions are closely interrelated. But, whatever his daily professional work, the state president today has many a perplexing problem of a different nature when he takes office.

The time was when our presidents had to preside in a dignified manner at a meeting or two but had few other disturbing duties. We feel sure that Dr. Ruggles will testify that there is plenty of work and worry associated with the office. He has done a fine job with enthusiasm and fidelity and we congratulate the Society that his successor has shown his ability and willingness to take over a far from easy situation.

"PEDIATRICS"

The new journal, "Pediatrics," the official publication of the American Academy of Pediatrics, has issued its first number in March. As the official journal of the Academy, with the loyalty of the large membership of this society, "Pediatrics" is sure to be one of our best periodicals. In addition to publishing the cream of the clinical papers, it will voice the opinion of the Academy on medical economics and changes in medical care. Libraries and hospitals should have it, and we recommend it to physicians interested in the diseases of children.

THE CHAPIN MEDAL

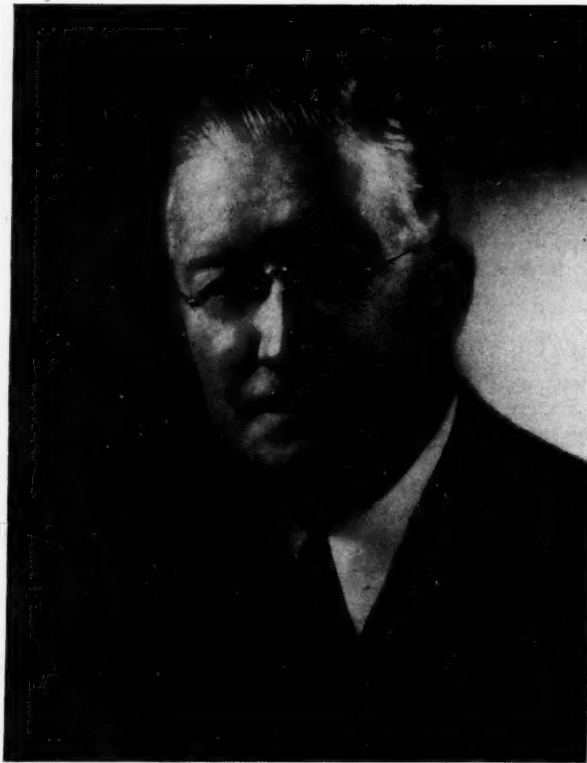
When the annual meeting of the Society was planned for 1942 the late Dr. Charles F. Gornly, then President of the Society, proposed that an annual lecture be instituted to be known as the Charles V. Chapin Oration. The suggestion was adopted. Dr. Timothy Leary, Professor of Pathology at Tufts College, was designated as the first orator, and his presentation in June, 1942, has been the forerunner of a series of lectures that has already, in the span of six years, attained national recognition.

Another Tufts Medical School leader won the nomination as the orator of the day for the 1943 meeting. Dr. Edwin H. Place, professor of clinical pediatrics, presented a thought-provoking and scholarly treatise on the "Changing Views of Contagious Diseases." Then followed in succeeding years the outstanding papers by Drs. Reginald Fitz, Francis G. Blake, Joseph Stokes, and Stanhope Bayne-Jones.

Taking recognition of the Society's tribute to Dr. Chapin, the Providence City council voted in 1943 that there should be a medal award from the City to the Chapin orator each year. Subsequently an attractive gold and silver medal was designed and struck by the Gorham Company, and awarded by the Mayor of the city of Providence to the Society's Chapin orator.

It was not until this year, however, that the Society and the City cooperated in making possible the award of medals to the first two orators, Drs. Leary and Place. Mayor Roberts graciously took time from his many duties to make the presentations at our mid-winter meeting. The brightness of the occasion was dimmed only by the fact that a convalescence from illness prevented the attendance of Dr. Leary.

It is gratifying to know that the pioneer Chapin orators have received equal recognition with those who followed them.



JOSEPH C. O'CONNELL, M.D.
of Providence, R. I.
President of the Rhode Island Medical Society
1948-49

**TO THE OFFICERS AND FELLOWS OF THE
RHODE ISLAND MEDICAL SOCIETY**

Again the Rhode Island Medical Society is facing a new year which I believe will present many challenges to our foresight and our ingenuity.

Under the able administration of my predecessor much has been accomplished. Many problems remain for solution in the coming months.

While we must continue to increase our knowledge of and improve our technique in the treatment of individual patients we must also strive to work out in our Society the various public health and National Defense problems which confront us. We must, by study of these problems, be prepared to initiate any desired or salutary laws concerning Public Health rather than to have laws forced upon us by those whose training does not qualify them to dictate our actions. We must in our dealings with the Public so treat them that they will look to us rather than to other sources for help in their medical problems. To prevent unsatisfactory health legislation which will be harmful to the profession and much more so to the Public, we must continue to educate the Public by lectures, radio and individual talks, to offset some of the propaganda which is being used to the detriment of the profession. We must strive unceasingly to improve conditions which we know are not perfect, in order to save the people from the conditions which would prevail under a system of compulsory federal medicine.

We have made great progress in our Voluntary Surgical Plan but there are still some kinks to be ironed out. The Committee in charge of this important matter has worked long and faithfully and deserves our praise and approbation. This plan when started may not be perfect but as flaws are recognized they can be remedied. We have already started a National Defense program which will require a great amount of work on the part of many of our members.

During the coming year the new Veterans Hospital will probably be ready for operation and the Society hopes that it may be of assistance to the Veterans Administration in providing a qualified staff of clinicians and teachers.

We hope that the clouds of war which now seem to be forming will be dispersed but if men must be made ready to preserve our National life, we will strive to the end that the Medical profession will be properly organized to help them do their job, and also to protect the civilian population against any possible war disaster.

JOSEPH C. O'CONNELL, M.D., *President*

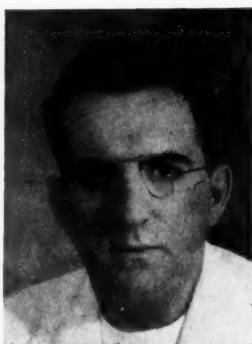
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THE RHODE ISLAND PLAN

Questions and Answers Concerning the Program for Voluntary Prepaid Non-Occupational Surgical and Obstetrical Insurance Sponsored by the Rhode Island Medical Society in Cooperation with Insurance Companies.

1. *What is the Rhode Island Surgical Plan?*

Briefly, it is a plan developed by the Rhode Island Medical Society to increase the extent to which voluntary insurance against the cost of surgical obstetrical care is made available to the people of Rhode Island, at the lowest practicable cost under competitive conditions. It is especially designed to assist the low-income group to meet the cost of medical care.

2. *Who sells the Insurance?*

Any insurance company licensed in Rhode Island, and Blue Cross, may sell insurance policies under the plan provided such policies are first approved by the State Insurance Department and then by the Rhode Island Medical Society on the basis of principles stipulated by it and aimed to protect and aid those insured.

3. *How will the plan be sold?*

Generally to groups of employed persons where payment of the premium can be made as one payment for those covered. Individual insurance companies will sell policies according to their own sales plans, but policies will be available with some companies to groups of 5 or more. Eventually it is hoped that the benefits of the plan will be available to individuals.

4. *Can dependents be covered?*

Yes. The insured can provide insurance for a spouse and unmarried children between the ages of three months (some policies cover from an earlier age) and 18 or 19 years of age for additional premium. Dependents receive the same indemnities.

5. *Will surgical bills be paid in full under the plan?*

If an individual's total income is below \$2,000 a year and his aggregate family income is below \$3,000 (and his unearned income does not exceed \$500 a year), or if he has dependents and his and their aggregate gross income is below \$3,000 a year (and their total unearned income does not exceed \$1,000 per year), the benefits of the policy as regards surgery, obstetrics, assistant's fee and anesthesia will be accepted by participating physicians as full payment for their services.

6. *What about persons not in these income limits?*

Persons above these income limits will have the indemnity fees applied towards the physician's total bill, with such persons liable for any fee charged in addition to the insurance benefit.

7. *Can the insured have private room accommodations at a hospital and still remain in the eligible income group?*

Yes, when such accommodations are deemed necessary by the attending physician. The Rhode Island plan has for its primary purpose complete service to persons in the eligible income group where the services are rendered up to and including a semi-private level, including such extra services as are deemed necessary by the surgeon. If the insured, however, at his own option selects private accommodations he thereby removes himself from the eligible income group.

8. *Does the plan conflict in any way with the Blue Cross?*

No. The benefits paid under it are not covered by the Blue Cross hospital plan. Blue Cross does not provide any indemnity for services by physicians. The insured does not have to be hospitalized to secure benefits under the surgical plan.

9. *What services are included under the plan?*

Surgery in the hospital, the physician's office, or the patient's home, obstetrics, treatment of fractures, anesthesia when given by a licensed physician, and the services of an assistant surgeon when necessary.

10. *What preoperative and postoperative care is provided?*

All usual pre- and postoperative hospital care.

11. *Are obstetrical benefits immediately available?*

Most policies provide immediate coverage for obstetrical benefits provided the insured employee enrolls under the plan with the group within a specified enrollment period; otherwise a waiting period of nine months is generally imposed. While a nine months' waiting period is generally proposed for dependents, immediate obstetrical coverage may be obtained for them usually with an additional premium required. Persons should inquire about this coverage when purchasing policies.

continued on page 314

to reduce risk
of vascular accident

due to

**INCREASED
CAPILLARY
FRAGILITY—**

• HYPERTENSION •
ARTERIOSCLEROSIS
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PHENOBARBITAL 15 mg.—provides mild and continuing sedation desirable in treatment of hypertensive and cardiac cases.

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12. What obstetrical benefits are included?

Benefits are provided for delivery, miscarriage, Caesarian sections, and ectopic pregnancies.

13. Are injuries compensable under the Workmen's Compensation Law covered?

The plan is designed to cover all injuries *not* compensable under the Workmen's Compensation Law.

14. What are the limits to the benefits?

The total for all operations due to the *same or related* cause which are performed during a continuous period of disability is \$150 and operations that are not separated by three months shall be deemed to have been performed during such a continuous period of disability, unless clearly unrelated.

15. Suppose more than one operation is performed at the same time. Are the indemnity payments totalled for determining the benefit, or is the largest indemnity amount paid?

When more than one operation is performed at one time or in immediate succession, payment will be made for each in accordance with the stated schedule of indemnities. The indemnities are totalled, but in no event is the total to exceed \$150. Procedures performed through the same incision shall be considered one operation.

16. Will the entire schedule of indemnities be incorporated in the policy?

Most insurance companies will publish the complete master schedule. Some may use an abbreviated schedule, but in every case all policies must provide indemnities according to the master schedule drafted by the Rhode Island Medical Society.

17. Is the schedule of indemnities permanent?

The Rhode Island Medical Society has a Health Insurance Committee that will study and report on changes in the plan as experience warrants, in order to provide the best possible protection for the majority of the people.

18. What indemnity is provided for procedures not listed in the master schedule of indemnities?

Payment for unlisted procedures will be determined in amounts consistent with those listed in the Master Schedule.

19. Does the insured person receive the benefit?

If he is in the eligible income group and selects a participating physician he directs that the indemnity be paid directly to the physician in return for the promise of the physician that the indemnity will cover the cost as listed. If he is not in the

eligible income group he may assign the amount of the indemnity to the physician as part payment of the total bill, or he may receive the indemnity himself.

20. Does the insured person have free choice of physician?

Any insurance company whose policies are sold under the Rhode Island plan shall not interfere with the insured's free choice of a physician. Only participating physicians, however, are obligated to accept the indemnity as complete payment for service rendered those in the eligible income group.

21. Who is a participating physician?

Members of the Rhode Island Medical Society who sign an agreement with the Society to render full service to insurance beneficiaries within the income limits stipulated are listed as participating physicians. Approximately 90 per cent of all active physicians in this state have already agreed to participate in the plan.

22. How do I know who are the participating physicians?

A list of participating physicians will be available to all insured persons through the company selling the insurance, or through the Rhode Island Medical Society, 106 Francis Street, Providence 3, Rhode Island.

23. Will the list of participating physicians indicate specialists?

No. But the list will be divided according to areas, and the name and address of participating physicians will be listed.

24. If service is obtained from a non-participating physician does the insured person have the same coverage?

He receives the same indemnity benefit, but he will not have the assurance, if he is within the eligible income group, that this benefit will pay the fee in full.

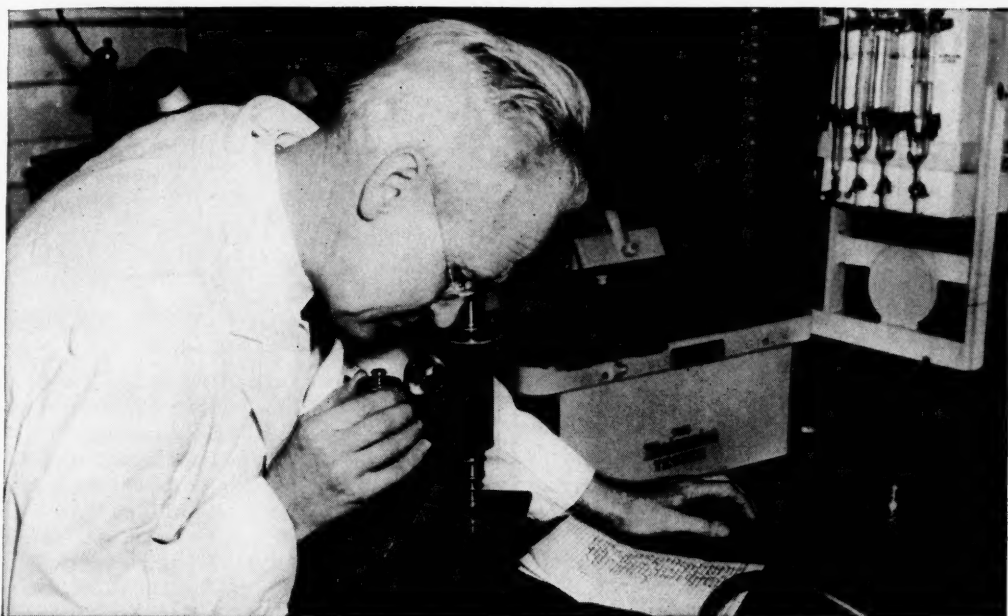
25. Does the insured person have to purchase other insurance to secure the surgical contract?

No. The Society has stipulated that an insurance company whose policy is approved under the plan shall not make it a condition of selling it that the prospective policy holder shall take any additional or other form of insurance.

26. What about medical benefits?

The plan as approved by the Society is restricted to surgery at this time. As experience is gained it is hoped that medical care without surgery may be added. Some insurance companies do sell medical care riders that may be added to the surgical policy.

continued on page 317



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THE RHODE ISLAND PLAN

continued from page 314

27. Does the Medical Society determine the premium rates of policies?

No. The Society is under no obligation whatsoever to review the premium rates of those policies submitted for its approval. The Society desires the premium rates to seek natural levels advantageous to the public through competition.

FRACTURES OF THE SHAFT OF THE TIBIA

concluded from page 301

ture of the upper third of the fibula. The admission x-rays show slight overriding with lateral displacement of the distal tibial fragment. The leg was manipulated and a cast applied. X-rays taken after this procedure show posterior displacement of the distal tibial fragment with an apparent increase in the overriding. The cast was removed and further manipulation was carried out with the patient on the Bell table. Traction was maintained while the cast was applied. The next x-rays taken February 20, 1947 now show satisfactory position. On March 10, 1947 x-rays were taken which show the fragments to have slipped. The cast was removed and a Kirschner wire was placed through the os calcis. Traction was applied with the leg in a Thomas splint. X-rays taken March 16, 1947 now show the fragments to be in good position again. The traction was maintained until April 25, 1947 when the wire was removed and a plaster cast was applied. He remained in plaster until August 8, 1947. At that time he had clinical union although the fracture line is still visible. At the present time he walks about with no discomfort and has solid union clinically.

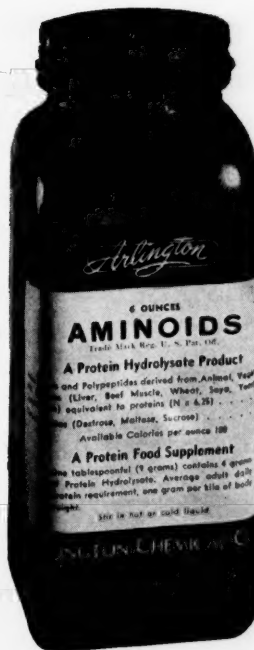
N. E. INDUSTRIAL CONFERENCE

The Spring meeting of the New England Conference of Industrial Physicians and Surgeons will be held on Thursday, May 27, at the Bond Hotel in Hartford. An attractive program starting at 11 o'clock in the morning will be climaxed in the evening with a dinner at which a feature address will be given on "How Industry Looks To and At Its Health and Safety Services." Dr. Stanley Sprague, chairman of the industrial health committee of the R. I. Medical Society will lead the discussion on papers to be given in the afternoon on the training of industrial physicians and nurses, and on trends in health services in small industries.

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Gilbert, John J.
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Greenstein, Jacob
Gregory, Kalei K.
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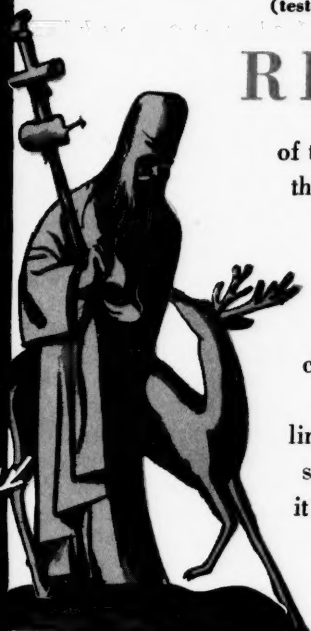
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THE DR. ISAAC GERBER ORATION

On March 10, 1948 the Miriam Hospital staff inaugurated an annual oration to be known as the Dr. Isaac Gerber Oration. We who have known Doctor Gerber these many years might comment at length on his accomplishments, but it is doubtful that we could pay a more eloquent tribute than that of Dr. Merrill C. Sosman, director of the department of radiology at the Peter Bent Brigham Hospital, Boston, which we quote below. To this tribute we add the sincere appreciation of the Rhode Island Medical Society to the staff of Miriam Hospital for its thoughtful action in honoring a Fellow of our Society for whom we all have the greatest admiration

—The Editors

IT IS a pleasure and a privilege to be with you tonight, and a great honor to be invited to give the first Isaac Gerber lecture. We, in Boston, have known Dr. Gerber for many years and have admired him not only for his ability and his learning, but also for his indomitable courage. He rarely misses any of the important medical meetings in Boston, even during the height of our beautiful winter season, and it is always a stimulus to see him in the audience. His desire to learn, his thirst to acquire knowledge have characterized him ever since I have known him.

Dr. Gerber is essentially a Bostonian, transplanted to the salubrious soil and climate of suburban Providence. He was born in Boston, educated in the Boston English High School, Harvard College and Harvard Medical School, where my researches reveal that he was graduated *cum laude*. He was an intern at the Boston City Hospital and it was there that his future career was determined, but without his realizing it until several years later. At the City Hospital he came into contact with, and fell under the spell of, Francis H. Williams who first interested him in the strange new x-rays, particularly their use in examining the heart and lungs of the patients on his wards. Those of you who knew Dr. Williams will remember what an enthusiast he was, — quiet, scholarly and thorough, but a missionary in thought and deed in those benighted days when physicians thought they could diagnose pulmonary tuberculosis with the stethoscope!

Having been inoculated with the virus of Roentgenology, Dr. Gerber exposed himself to still further infection by studying with Levy-Dorn in Berlin, Haudek and Holzknecht in Vienna, and was a friend and co-worker with Arthur Schüller at the Allgemeine Krankenhaus where his interest in cranial roentgenology was aroused. That was in 1912, the year that Christian and Cushing and their associates toured Europe with the purpose of obtaining ideas and perhaps men for the new Peter Bent Brigham Hospital, about to be opened in Boston the following year. But for a missed appointment with Cushing, Dr. Gerber might have been the new Roentgenologist at my hospital, — and then I would not have been here on this happy occasion.

It is unnecessary to remind you, I am sure, that Dr. Gerber gently metastasized to Providence in 1914, (the first physician in this state to limit his practice to Roentgenology), and of how much he has done for medicine and Roentgenology in the 34 years since he has been one of you. For several years he maintained a base of operation in Boston, but finally recognizing the superior virtues of Providence severed official connection with his native town and has since concentrated his effort in your city. He was active in establishing the department of radiation therapy at the Boston City Hospital in 1924, and a similar one at the Pondville Hospital in 1927. He is or has been on the staffs of most of the hospitals in Rhode Island, belongs to all of our national radiological societies, is a life member of the British Institute of Radiology and is currently, I understand, a Vice-President of the Rhode Island Medical Society. His contributions to the medical literature have been numerous and varied, and I know of no one in our X-ray Societies who has as thorough a knowledge of radiological literature as Dr. Gerber.

Dr. Gerber has always been an Index Medicus and a peripatetic library for our radiological meetings and clinics not only in New England but all over the country.

After accepting the invitation to give this address, I was happy to have Dr. Gerber's suggestion that I speak to you about Pituitary Tumors in general and Pituitary Basophilism, or Cushing's Disease, in particular. Pituitary tumors have in-

terested me continuously for 25 years, and my association with Harvey Cushing gave me an unparalleled opportunity to observe and study them. The historical background is fascinating and the

story exemplifies how difficult it is to acquire knowledge in any field of medicine, doubly difficult it seems, when one deals with the endocrine glands and the hormones.

RESPONSE OF DR. ISAAC GERBER

THERE IS very little that one can say in response to such eulogies as have been heaped on me tonight. You all realize of course that this is an extremely unusual occasion, at least from my point of view.

Named lectures generally have been inaugurated in honor of individuals who have already passed on. In the present instance my colleagues and friends of the Miriam Hospital staff have chosen figuratively to send me flowers while I am still around and able to enjoy their fragrance and beauty. It is certainly not for me to decry their choice.

The idea of the annual lectureship in itself is indeed a most admirable one. It is a fitting way of having the hospital, now well along in its third decade of service, show its appreciation of being a real part of the medical community of Rhode Island.

By having a regular stated lecture by eminent, outside medical authorities, the hospital is certainly producing a substantial addition to its usual medical contribution. I sincerely hope that this lectureship will in the future steadily aid in the medical progress of our profession in Rhode Island.

As for myself, I can only state that I am indeed extremely appreciative of the high honor that has been given to me by attaching my name to this projected series of lectures. I am also greatly touched personally by this overwhelming indication of friendliness and esteem on the part of my colleagues in the Miriam Hospital.

I know that you have not gathered here tonight to listen to me. I do not feel that I should encroach further on the speaker's time, and wish once more to express my deepest thanks for this tremendous honor.



DR. ISAAC GERBER

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Emidy, H. Lorenzo
Ferrucci, Dominic
Flynn, Thomas S.
Fontaine, Aurey
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Gauthier, Henri E.
Kaskiw, Emil A.
Keegan, George A.
Kennedy, John A.

King, Alfred E.
King, Francis J.
Lalor, Thomas J., Jr.
Levine, Harry
Levy, William S.
McCarthy, James M.
McCooley, James H.
Medoff, Edward B.
Monti, Victor H.
O'Brien, James P.
Reilly, Joseph W.
Rocheleau, Walter C.

Sheridan, Philip H.
Tanguay, J. Edgar
Tremblay, Euclide L.
Tweddell, Henry J.
Vian, George M.
Wittes, Saul A.

OUT OF STATE

Heffernan, Edward V.
(Presently in military service)

Total participating physicians, April 1, 1948—553

DISTRICT MEDICAL SOCIETY MEETINGS

PAWTUCKET MEDICAL ASSOCIATION

The annual banquet of the Pawtucket Medical Association was held March 19, 1948, at the Pawtucket Golf Club. The business meeting was held at noon the same day at the Nurses' Auditorium of the Memorial Hospital.

Application for membership of Dr. Andrew Gerard Czekanski was read and referred to the Standing Committee.

The question of increasing the yearly dues was discussed at length and a motion for this purpose was defeated. It was unanimously voted that a Program Committee of five members be appointed by the Chair for the coming year, starting with September meeting, the topics to be published in advance. If a deficit results, an assessment up to \$25 shall be made.

The business meeting adjourned to the banquet which followed at 6:30 p. m. at the Pawtucket Golf Club.

The following slate of officers were unanimously re-elected for the coming year:

President: Earl J. Mara, M.D.

Vice President: John Gordon, M.D.

Treasurer: Laurence Senseman, M.D.

Secretary: Kieran Hennessey, M.D.

Delegates:

Earl Mara, M.D.

Charles Farrell, M.D.

Robert T. Henry, M.D.

Henry J. Hanley, M.D.

Standing Committee:

G. Raymond Fox, M.D.

Joseph H. Doll, M.D.

Armand A. Bertini, M.D.

Edward H. Trainor, M.D.

William N. Kalcounos, M.D.

Dr. Mara thanked the members for their confidence and promised that the meetings would be better and more appealing to all. He asked for increased support.

Dr. G. Raymond Fox presided ably as toastmaster and following the banquet a number of door prizes were distributed. The members were then entertained by a magician and his troupe.

The meeting adjourned at 9:40 p. m. Thirty-nine members attended.

Respectfully submitted,

KIERAN W. HENNESSEY, M.D., *Secretary*

NEWPORT COUNTY MEDICAL SOCIETY

A meeting of the Newport County Medical Society was held at the Newport Hospital on Tuesday evening, March 23, 1948, with seventeen members attending.

The meeting was called to order at 9:00 p. m. by Dr. Philomen P. Ciarla, President.

Dr. Lewis Abramson moved that the application of Frank A. Stewart, M.D., for membership be accepted. This was seconded by Dr. Frank Logler and unanimously approved by the body.

Dr. Henry W. Brownell moved that the Treasurer, Dr. Norbert Zielinski, list the members that had not paid their dues to the Newport County Medical Society and further moved that if after notification these members refused payment that they be dropped from membership. The motion was seconded by Dr. Osmond Grimes and approved.

Dr. Philomen Ciarla recommended that the county society, as a whole, should object to those newspapers that have continued, in spite of previous objections, to publish individual doctors' names.

Guest speakers of the evening were Doctors Henry E. Utter and William P. Buffum of Providence whose spirited talk on "Upper Respiratory Disease in Childhood and its Relation to Allergy" precipitated a lively thirty minutes' question and answer period. The factors in the spread of upper respiratory disease, the types of infections, the preventive measures, the relationship of recurrent respiratory infections to an allergic background and the role of the chemotherapeutic agents were touched upon.

The meeting adjourned at 11:00 p. m. A collation was served.

Respectfully submitted,

JOHN M. MALONE, M.D., *Secretary*

KENT COUNTY MEDICAL SOCIETY

The regular monthly meeting of the Kent County Medical Society was held at the Dreyfus Frog Farm in Warwick, Tuesday, March 9, 1948. After dinner the meeting was called to order at 10:20 p. m. by the President. Reading of the minutes of the last meeting was dispensed with in the absence of the Secretary. Dr. Vidal called upon Dr. Edmund Hackman to act as Secretary pro-tem.

Dr. Francis Temple of Hoxie was voted in by the assembly as a new member.

The speaker of the evening, Dr. Henry E. Utter, then gave an important interesting talk on "Office Pediatrics." After discussion by the members of mutual problems in the practice of pediatrics, Dr. Utter was given a rising vote of thanks.

Motion to adjourn was made and seconded at 11:30 p. m.

EDMUND HACKMAN, M.D.,
Secretary Pro-tem

WOONSOCKET DISTRICT MEDICAL SOCIETY

The first Spring meeting of the Woonsocket District Medical Society was held on April 13, 1948, at 9:00 p. m. at the St. James Hotel. The meeting

was called to order by the President, Dr. Richard H. Dowling at 9:20 p. m.

The applications of Drs. Philip H. Sheridan, Alton P. Thomas, Dominic P. Ferrucci, and Charles E. Brochu were considered and accepted. They were unanimously elected members of the Society.

Dr. Francis J. King discussed a committee meeting with the publisher of the *Woonsocket Call* regarding Chiropractic advertisements. It was revealed that the publisher agreed to omit statements regarding definite claims of cure. It was noted by some of the members that the character of the advertisements had not changed much since the discussion.

Dr. Henry E. Gauthier talked about his attendance at meetings of the State Society committee for Prepaid Surgical Insurance. The difficulty concerning the low income bracket inclusion was discussed.

There being no further business to come before the Assembly, the meeting was adjourned at 9:55 p. m.

Respectfully submitted,
ALFRED E. KING, M.D., *Secretary*
Woonsocket District Medical Society
continued on next page

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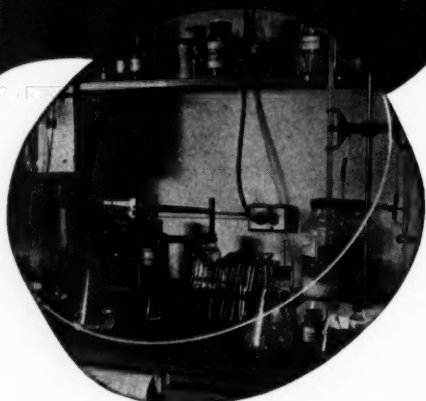
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RHODE ISLAND MEDICAL JOURNAL

PROVIDENCE MEDICAL ASSOCIATION

A regular meeting of the Providence Medical Association was held at the Medical Library on Monday, April 5, 1948. The reading of the minutes of the previous meeting was omitted by consent of the members present.

Dr. Daniel V. Troppoli, Secretary, read a communication from Dr. Reginald Fitz, orator on the occasion of the Association's Centennial, thanking the Association for the resolution adopted at its meeting on March 1, 1948 commending him for his contribution to the Centennial program. Dr. Frederick Webster presented the following resolution relative to the College of Pharmacy.

WHEREAS, the field of therapeutic medicine has been and is being increasingly augmented by the discovery of new and powerful drugs and remedies, and

WHEREAS, the physicians of this City and State depend in great measure upon trained pharmacists for the careful preparation and dispensing of drugs and remedies prescribed by them, and

WHEREAS, every opportunity should be made available within our State for the proper and adequate training of young men and women for a career in pharmacy in the interest of community health.

THEREFORE, BE IT RESOLVED, That the Providence Medical Association express its full endorsement of the building fund campaign of the Rhode Island College of Pharmacy and Allied Sciences, and further that it urge the generous financial support of the citizens of this State for this outstanding educational institution.

The resolution was seconded and unanimously adopted.

The scientific program was started with the showing of a motion picture with sound on Gastroscopy presented by Harrower Laboratories which showed the development of the gastroscope from the early days the Germans got the idea from watching a sword swallower to the modern instrument.

It was demonstrated that aluminum hydroxide and trisilicate when given with muccin formed the best coat over the ulcer and stomach mucosa.

It stressed the importance of using both x-ray and gastroscopy for accurate diagnosis of stomach disease.

Dr. Walter C. Weigner, Assistant Physician, Outpatient Department, Department of Neurology and Psychiatry, Rhode Island Hospital, presented the first scientific paper on the subject "Ascending Paralysis—Complete Recovery".

Dr. Weigner presented an excellent bibliography of Laundry's Ascending Paralysis and then presented a case unique in that the patient survived two attacks of a malady which is usually fatal.

The criteria to be met in making a diagnosis of Laudry's Paralysis are:

1. Rapid Onset
2. Motor involvement only
3. No sphincter disturbance
4. No pathological changes

At present about 30% of cases show pathological changes and these are in the anterior horn cells.

Dr. Batchelder announced that in continuance of the policy initiated at the March meeting of having a representative of a local health and welfare agency address the members, he had invited Mrs. Edward H. Fuller, Executive Secretary of the Providence League for the Hard of Hearing to speak to the Association. Mrs. Fuller explained the work of the League for the Hard of Hearing stating that three years ago a committee was formed to select hearing aids for the deaf. Prior to this, these patients bought aids which were not the proper ones for their specific needs and could not use them.

The committee saw dealers who loaned them a model of each type. The patients are tested impartially and the proper aid selected and patient referred to the proper dealer to obtain it. There are at least twelve different hearing aids on the market. She appealed to the Doctors to acquaint patients with the work of the Hard of Hearing Society. The longer a patient goes without hearing sound, the more difficult it is for them to get used to it again.

In addition they conduct classes in lip reading for those whose hearing loss is not too great. She made the startling statement that one out of every twenty-five children of school age develop hearing difficulty.

The final scientific paper of the evening was given by Dr. Vincent J. Oddo, Surgeon-in-chief, Urological Department, St. Joseph's Hospital.

Dr. Oddo presented a new technique for radical cure of a hydrocele that he had performed on eighteen patients without recurrence.

He presented slides showing the pathology of the tunica vaginalis in hydrocele.

The commonly used operation is the bottle operation. He feels this leaves a large mass of tissue, causes hematoma and adhesions. Some reef the tunica instead of everting it. In another technique the tunica is excised.

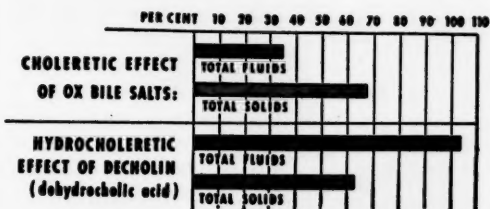
The author has a new physiological principle. He feels hydrocele is due to trauma or infection hence the pathological picture of chronic inflammation. In the author's technique, he makes an incision in the tunica vaginalis about three-quarter to one inch long and sutures the edge with eversion. A drain is placed inside the tunica and it is removed in twenty-four hours.

The meeting adjourned at 10:10.

Respectfully submitted,

DANIEL V. TROPOLI, M.D., *Secretary*

DECHOLIN HYDROCHOLERESIS Encourages Biliary Tract Drainage



● Percentage Increase in Composition
and Quantity of Bile Flow

Ivy, A. C., et al: *Am. J. Dig. Dis.* 7:333 (Aug.) 1940.

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an increased production of thin liver bile—is a desirable approach to therapy of non-obstructive biliary tract disturbances.

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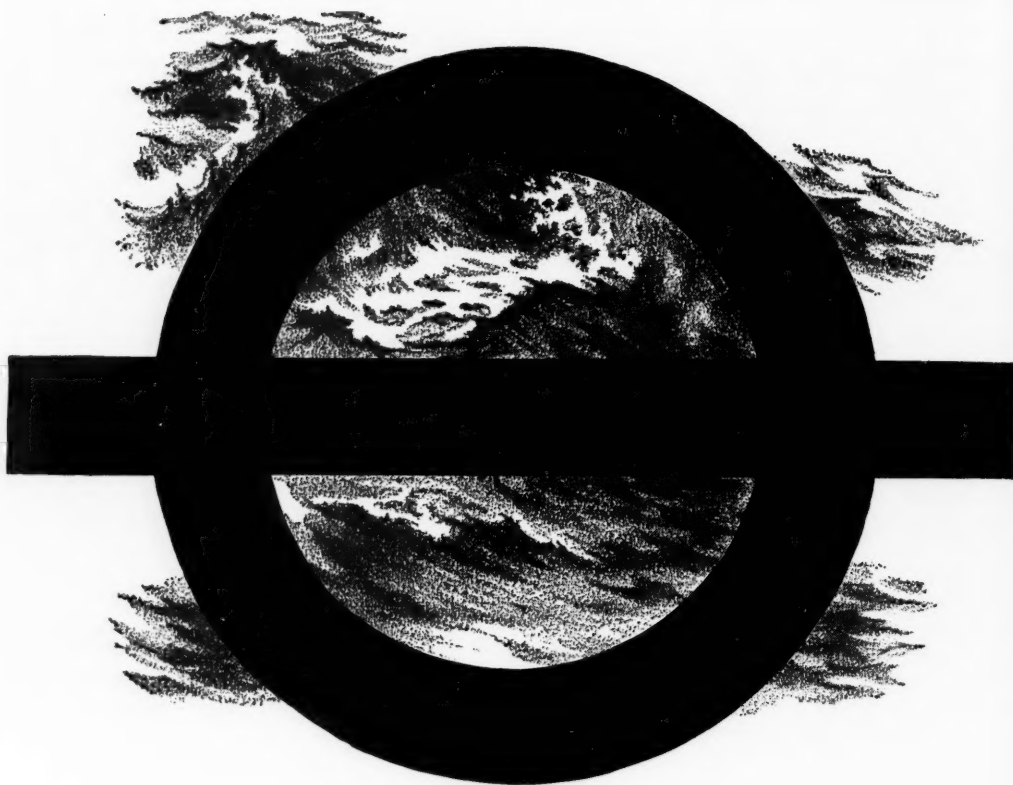
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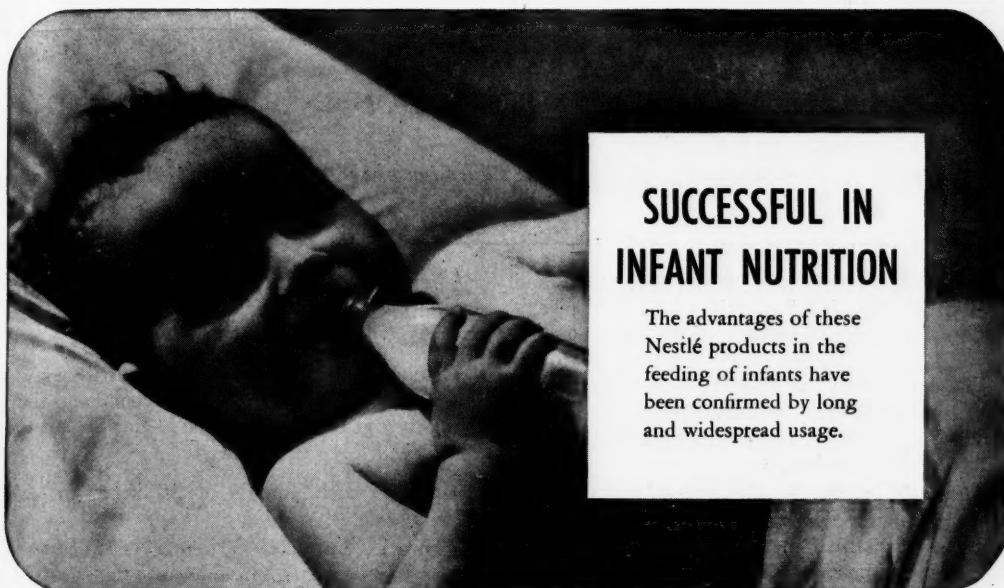
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POSTGRADUATE MEDICAL EDUCATION IN RHODE ISLAND

Compiled by the Committee on Postgraduate Education of the Rhode Island Medical Society

THE FOLLOWING is a list of meetings, clinics and similar educational exercises held at the various hospitals which members of the Rhode Island Medical Society are privileged to attend. Through the cooperation of the hospitals listed the medical profession of the state is thus offered an excellent opportunity to keep touch with modern medicine in its various branches.

Although practically all the conferences listed below are held regularly as scheduled it is advisable that physicians planning to attend them communicate with the hospital ahead of time to make certain that the conference will be held.

BUTLER HOSPITAL (GAspee 3456)

Conferences and Seminars

Special arrangements should be made by individual physicians wishing to attend these exercises by communicating with the Superintendent, Dr. David G. Wright.

* * * *

CHARLES V. CHAPIN HOSPITAL (DExter 7400)

Monthly staff meeting (C-P-C)

Third Wednesday every month except July and August.

Department of Pediatrics

Tuesday, at 11:30 a. m., lectures by resident and visiting staff members.

Thursday, at 11 a. m., pediatric ward rounds and conference.

Department of Neuro-Psychiatry

Thursday, conference from 10 to 11 a. m.

Daily, observation of insulin coma treatments.

Monday, Wednesday, Friday, 8 a. m., electric shock therapy.

Department of Tuberculosis

Monday, at 11 a. m., conference on pulmonary tuberculosis and related pulmonary diseases.

* * * *

PAWTUCKET MEMORIAL HOSPITAL (Perry 3021)

Clinicopathological Conference

Clinicopathological Conferences have no set date. Check with hospital.

Demonstrations and Reviews of Pathology

Demonstrations and reviews of pathology by Dr. B. Earl Clarke and Staff on second and fourth Thursdays at 11:15 a. m. in the X-Ray Department.

Medical Service

Grand Ward Rounds at 10:30 a. m. every Monday.

Thoracic Clinic at 10:30 a. m. every Wednesday.

Conference at 10:30 a. m. every Thursday followed by Pathological lecture.

Surgical Service

Grand Ward Rounds at 10:30 a. m. every Tuesday.

Surgical Conference on the second Tuesday of the month at 11 a. m.

Daily Ward Rounds at 10:30 a. m. except Wednesday when they will be held at 9:30 a. m.

Tumor Clinic

The first and third Thursdays of each month at 10:00 a. m.

Urological Service

Ward Rounds at 10:45 a. m. every Tuesday.

Ward Rounds followed by conference on the last Tuesday of the month.

Pediatric Service

Ward Rounds and Conference at 11 a. m. on the first and third Friday of each month.

Orthopedic Service

Ward Rounds at 9 a. m. every Monday.

Health Maintenance Clinics for Cancer Prevention (By invitation only)

Every Monday at 11 a. m.

Obstetrical Service

Ward Rounds and Conference at 10 a. m. second Friday of the month.

Neurological Service

Ward Rounds at 7:30 p. m. in the X-Ray Department on the second Thursday of the month.

* * * *

continued on page 334

to help vanquish depression marked by "morning tiredness"

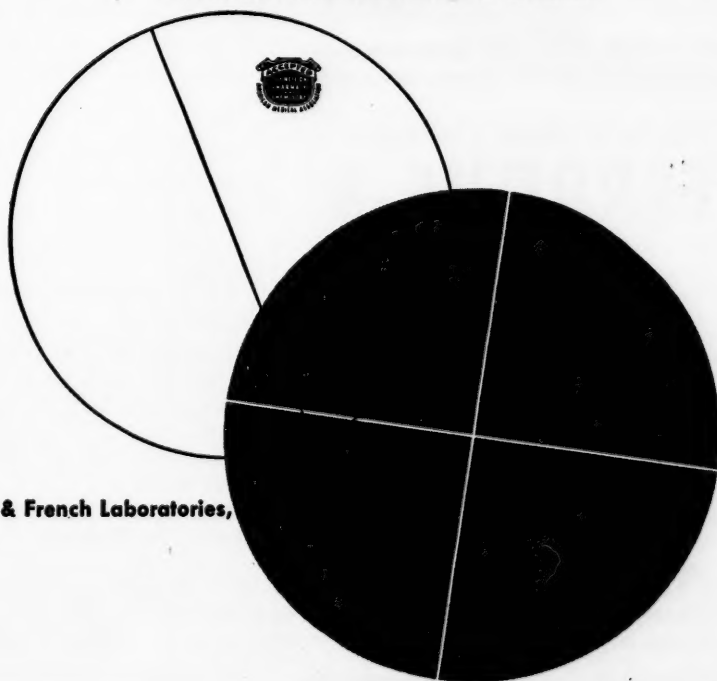
Many depressions are marked by morning tiredness, inertia, lassitude and retardation. 'Benzedrine' Sulfate, taken on awakening, frequently helps to lift the patient "over the hump" of the early hours.

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RHODE ISLAND MEDICAL JOURNAL

POSTGRADUATE MEDICAL EDUCATION IN RHODE ISLAND *continued from page 332*

PROVIDENCE LYING-IN HOSPITAL (DExter 3200)

X-Ray Conference

Tuesday at 11 a. m.

Staff Conference

Thursday at 9 a. m.

Members of the medical societies are cordially invited.

* * * *

RHODE ISLAND HOSPITAL (DExter 4300)

Cancer

Tuesday, 11 a. m., Cancer Detection Clinic—Clinic Building.

Wednesday, 10 a. m., Tumor Clinic—Clinic Building.

Dentistry

Friday, 9 a. m., Follow-Up Clinic—Clinic Building.

Dermatology

Monday, 10:30 a. m., Clinical Demonstration Conference—Out-Patient Department.

Eye

Thursday, 9 a. m., Teaching Eye Rounds—Ward A.

First and third Sundays, 11 a. m., Eye-Nerve Clinic—Potter Building Classroom.

Fracture

Friday, 11 a. m., Grand Rounds—Ward B, H, and Potter Building.

Gynecology

Monday, 1 p. m., Tumor Clinic—Clinic Building.

Tuesday, 9 a. m., Follow-Up Clinic—Clinic Building.

Tuesday, 10:30 a. m., Grand Rounds—Ward I.

Medicine

Tuesday, 10 a. m., Grand Rounds—Wards A and K.

Wednesday, 10 a. m., Grand Rounds—Wards A and K.

Thursday, 9 a. m., Gastro-Intestinal Clinic—Clinic Building.

Thursday, 11:30 a. m., Thoracic Clinic Conference—Clinic Building.

Friday, 11 a. m., Department of Cardiology—Conference—Heart Station.

Saturday, 10:15 a. m., Conference—Peters House.

Neurology and Psychiatry

Saturday, 9:15 a. m., Conference—Peters House.

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MAY, 1948

POSTGRADUATE MEDICAL EDUCATION
IN RHODE ISLAND
concluded from page 334

Orthopedics

Thursday, 9 a. m., Grand Rounds—Wards B, H and Potter Building.

Pathology

First and third Tuesday, 12 Noon, Clinicopathological Conference—Peters House.

Pediatrics

Friday, 11 a. m., Grand Rounds—Potter Building.

Surgery

Monday, 9 a. m., Peripheral Vascular Clinic—Clinic Building.

Monday, 9 a. m., Department of Neuro-Surgery, Grand Rounds—Ward C.

Monday, 10:30 a. m., Grand Rounds—Wards C or D.

Tuesday, 10:30 a. m., Grand Rounds, Ward C or D.

Friday, 12:00 Noon, Staff Conference—Peters House.

Urology

First and Third Thursday, 11:30 a. m., Grand Rounds—Ward C.

* * * *

ROGER WILLIAMS GENERAL HOSPITAL
(GAspee 1625)

Tumor Clinic

First and Third Thursday of each month at 10 a. m.

Pathological Conference

Second Friday of each month at 12 Noon.

These conferences are open to any and all physicians.

* * * *

STATE SANATORIUM AT
WALLUM LAKE
(Pascoag 22)

Staff Conferences

Daily from 11 a. m. to 12:30 p. m.

Thoracic Surgery

Every Tuesday, starting at 9:00 a. m.

Staff Meetings

Monthly every second Wednesday night at 8 p. m.

337

All physicians are invited to come to the Sanatorium at any time and the staff will be glad to acquaint them with what is being done.

* * * *

STATE HOSPITAL FOR MENTAL
DISEASES

(Hopkins 4700)

Journal Clubs and Pathological Conferences

Alternate on Mondays at 1:30 p. m.

Staff Conferences

When a single psychiatric case is discussed in some detail, staff conferences are held Tuesdays and Fridays from 1:30 to 2:30 p. m.

It would be desirable for any physician planning to attend, to telephone HOPKINS 4700 before driving to the hospital in order to avoid disappointment in the event of a cancellation which occurs occasionally.



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MEDICAL LIBRARY NOTES

SYMPOSIUM ON MEDICOLEGAL PROBLEMS. Edited by Samuel A. Levinson, M.D., PH.D., University of Chicago College of Medicine. J. B. Lippincott Company, Publishers.

This book of 249 pages is a review of meetings of the Institute of Medicine of Chicago and the Chicago Bar Association. The contents bring out, as the foreword states, "Because of the education and training that is given to the members of both professions and the opportunities inherent in their practice, they very clearly have a public duty to perform in the community. Those duties . . . extending into public welfare generally."

Among the problems discussed are Expert Testimony, The Medicolegal Implications of Artificial Insemination, The Medicolegal Problems of Pathology, Medicolegal Implications of Operations to Produce Sterility, Trauma in the Causation of Tumor, Blood Grouping in Paternity Cases, Chemical Tests for Intoxication.

The scientific presentation is made by medical men or men skilled in a scientific field and the legal viewpoint is presented by men learned in jurisprudence.

The presentations are excellently given and the legal viewpoint is excellently stated. The question periods allowed at the end of the presentations bring out diverse viewpoints, all of which are provocative of further thought.

The thing the scientific presentation seems to miss can be adequately expressed by the word of the late Justic Holmes viz. "The life of the law is not logic but expediency." However, when logic can be reconciled with expediency, i.e., when it becomes expedient to be logic, the scientific viewpoint may ultimately be so disclosed.

The clash of the numerous private and social interests is well demonstrated. The natural bias of attorneys representing individual interests as against corporate and state interests is obvious in the questions put to the speakers.

Throughout the book it is ideal that there is full and open discussion — without thought of embarrassment by putting the other fellow "on the spot."

Of course, the whole field of medicolegal matters is not covered. To do so would take volumes. The present monograph, however, is an excellent

beginning and might well serve as a model for future symposia conducted by the medicolegal associations of the several states.

J. Francis Daurman has finely prepared a foreword. The publishers have made the format of the book such that it is readable without fatigue. The speakers and their questioners have well discussed the problems presented and have left the reader with plenty of material for consideration.

Whether one appears in court or not, whether one is vitally interested in the subjects presented or not, the book is recommended for its stimulation of thought and also to show the practical difficulties that beset the reconciliation between that which is logic and/or expedient.

WILLIAM H. FOLEY, M.D.

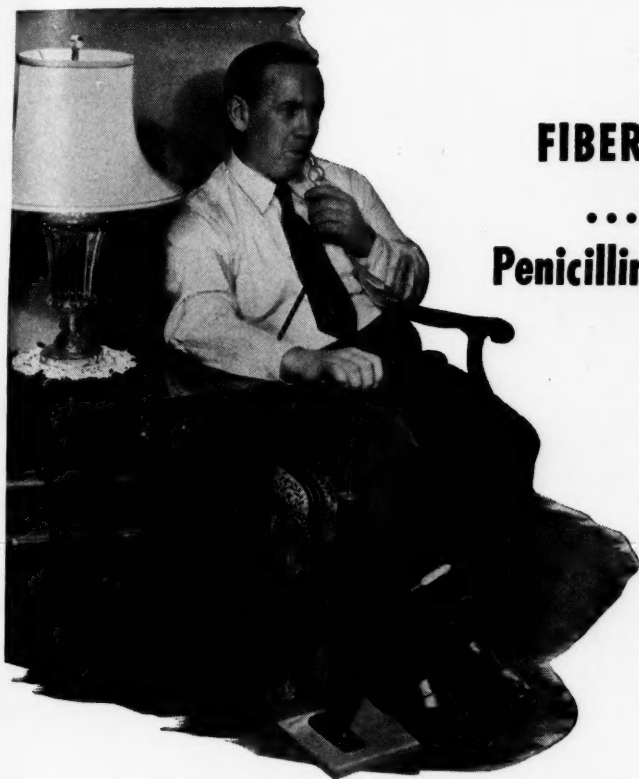
A PRIMER OF CARDIOLOGY, by George E. Burch, M.D. and Paul Reaser, M.D. Lea & Febiger, Philadelphia, 1947, \$4.50.

This book has been designed for use of students of medicine and for the physician who is beginning the study of cardiology and is remarkable because so much sound information has been condensed into such little space. The book shares with many other clinical textbooks the tendency to explain diseases of the heart and circulation on physiological grounds. In covering the more important aspects of the subject, the authors have made use of diagrams, sound records, phlebograms and pulse tracings in such fashion as to cover a mass of data in a short space.

General anatomic considerations, approach to the diagnosis of heart disease and the approach to a clinical cardiac evaluation (an excellent section), are treated in three general chapters. The remaining 100 pages are taken up with a discussion of the various types of heart disease and the bedside diagnosis and treatment of cardiac irregularities.

The statement on page 196 that the electrocardiogram in interventricular septal defect usually shows right axis deviation is at variance with the reviewer's experience. Although the book contains no material that could not easily be discovered in current texts on clinical cardiology, it will undoubtedly prove popular and can be highly recommended for the beginning student in cardiology.

HENRY MILLER, M.D.



FIBERGLAS* FIBERS ...filter air for Penicillin Aerosol Therapy

An inexpensive nebulization pump designed for simplifying penicillin aerosol therapy for home treatment has recently been reported†. A glass vial containing Fiberglas fibers is inserted at the end of the rubber hose of an ordinary bicycle pump and attached to this is a rubber tubing leading to the penicillin nebulizer. The Fiberglas fibers are used to filter the air when the pump is in operation. They help eliminate any foreign matter in the air stream and prevent plugging of the apparatus.

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†Finke, Walter, M.D., Simplification of penicillin aerosol therapy for home treatment, American Practitioner 1: 643-644, Aug. 1947.

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RHODE ISLAND MEDICAL JOURNAL

BOOK REVIEWS

MINOR SURGERY, 6th Ed. Frederick Christopher. Philadelphia, W. B. Saunders Co., 1948.

Christopher's *Minor Surgery* needs no introduction to the medical profession. It has been, and is still, an essential part of the general practitioner's and general surgeon's library. The sixth edition maintain the high standards and general form of its predecessors. There are only a limited number of changes necessary, inasmuch as the last edition was published only four years ago, but many new departures in treatment are covered.

Among the sections containing important revisions and additions are the passages devoted to thrombophlebitis, burns, and the local and parenteral use of antibiotics. There is also new material on gelatin sponge and oxidized cellulose, procaine in serum sickness, intra-arterial injection of penicillin, surgery of bedsores, placement of neck incisions, refrigeration anesthesia, and other items of current interest.

One of the most valuable features of the volume is the profuse number of references. While the book is necessarily influenced by the opinion of the author, he is broadminded enough to present various points of view and to document nearly every statement with references to the works of others.

As compared with editions older than the last previous one, the new sixth edition contains much more new material. For those who do not own one of the two most recent editions there is enough fresh material to warrant purchase of the new one.

THOMAS PERRY, JR., M.D.,

UNIPOLAR LEAD ELECTROCARDIOGRAPHY, by Emanuel Goldberger, B.S., M.D. Lea & Febiger, Philadelphia, 1947, \$4.00.

Unipolar leads represent a natural phase in the development of electrocardiography. For years electrocardiographic interpretation was based on analyses of the three standard leads alone. In more recent years, electrocardiographic leads in which a small exploring electrode placed over the precordium is paired with an electrode placed on the back or upon one of the extremities have come into widespread use. Because standard leads are complex and represent the difference between the electrical potentials at two points of the body, some criticism of the interpretation of such records has been raised. With the introduction of unipolar leads, there has occurred a gradually increasing appreciation of their clinical value. This small book is the result of Goldberger's extensive studies on this subject.

This new system of electrocardiography consists of three "augmented" unipolar extremity leads

continued on page 343

BOOK REVIEWS

concluded from page 340

(the aV leads) and the precordial leads each of which represents potentials from only one region of the body. The first part of the book is devoted to a description of the physiologic principles underlying the use of "augmented" unipolar extremity and precordial leads and the technique of obtaining such leads. This is followed by a discussion of the value of these leads in determining the position of the heart in the thoracic cavity. The second section of the book considers various abnormal electrocardiographic patterns. The discussion is well organized; in some instances more electrocardiograms would have been desirable for greater clarity.

Unipolar extremity leads may be of value in the interpretation of abnormalities of the Q waves, especially Q₃, and it is claimed that they may be useful in the differentiation of pulmonary embolism from posterior myocardial infarction, the diagnosis of small myocardial infarcts, the diagnosis of right ventricular hypertrophy, the interpretation of tracings with abnormalities of the RS-T segment and T wave, and the interpretation of tracings with minimal changes in the standard leads. The book deserves wide circulation. It is clearly written and well organized. It is to be hoped that the study and use of these leads, in conjunction with standard leads, will lead to a fuller understanding of various electrocardiographic patterns.

HENRY MILLER, M.D.

YOU AND YOUR DOCTOR, by Benjamin F. Miller, M.D., Clinical Professor of Medicine, George Washington Medical School. *Whittlesey House, publishers, New York, \$2.75, 1948.*

This book is a discussion of medical practice and problems in the United States, written primarily for the laity. The author presents all of the disadvantages and none of the advantages of the system of general practice and the reverse of group practice. He would abolish the general practitioner and substitute in his place a "pilot physician" whose chief function would be to route patients to the proper specialist. The inadequacies of modern medical and scientific education and research are vividly and aptly brought to the attention of the reader. A plan for the correction of medicine's dilemma is offered.

The author advocates government subsidization of medical education, research, and patient care based on a system of specialists groups and pilot physicians, financed by a form of compulsory insurance. Administration would be by the United States Public Health Service.

The book is well written and easily read. While it discusses a highly controversial subject it presents several worthwhile ideas and should serve well as an introduction to many of our health problems. Briefly, however, it is a demand for the socialization of medicine.

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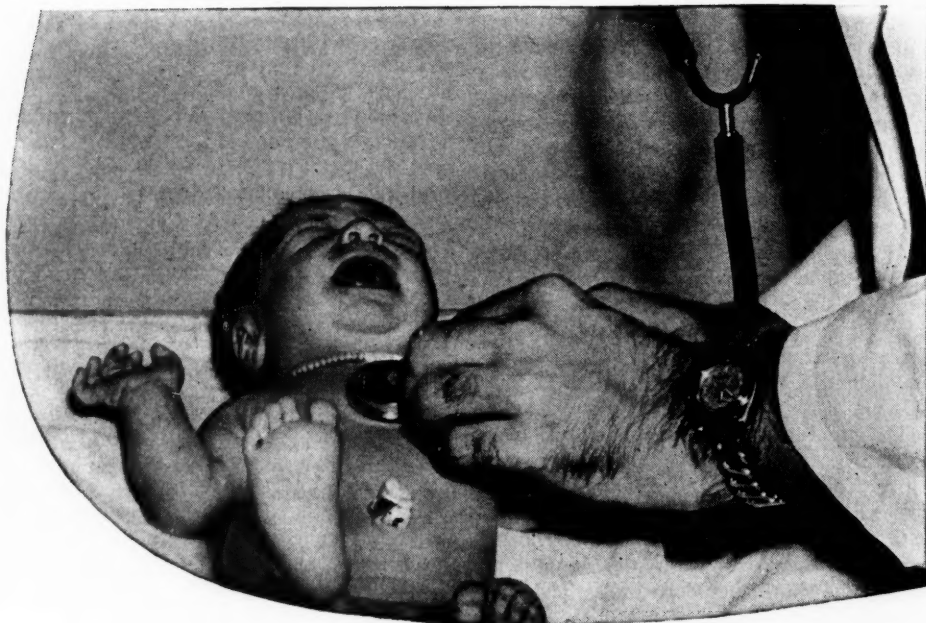
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HEALTH IN PROVIDENCE IN 1947

Below is the preliminary report of the Superintendent of Health and City Registrar for the year 1947.

During the year 1947 there were 97 more deaths and 975 more births than in 1946. The rates as shown have been figured at a population figure of 266,000 rather than at the federal estimate which is somewhat higher.

It is interesting to note that the increase in the number of deaths from heart disease during the year 1947 over that of 1946 equals the increase in deaths in the age group over 70. This figure also accounts for 90% of the total increase in the deaths over the previous year.

While there was an increase in the number of infant deaths in 1947, the Infant Mortality rate shows a decrease over the previous year. This is accounted for by the marked increase in the total number of births.

The 1946 epidemic of measles and whooping cough continued on through 1947. We were exceptionally fortunate in having had only one death from measles during this entire period. We were also fortunate in having no resident deaths from Poliomyelitis among the 46 cases reported.

The incidence of Diphtheria is on the increase.

It must be remembered that owing to the contracting world many persons returning from Europe are bringing back with them the diphtheria organism. Because of the comparative freedom from this disease, there has been a certain laxity on the part of parents in having their children properly immunized and tested. It is absolutely vital that parents become conscious of the fact that only by reschickening can they be sure that their children are still protected against this disease.

It is also gratifying to note that the downward trend of the incidence of Tuberculosis has continued for the year 1947. However, it must be realized that constant care and vigilance must still be exercised against this disease to prevent a change in this trend.

During December the Health Department re-codified its regulations regarding restaurants and other eating and drinking establishments, to comply more closely with the standard Federal Ordinance.

During the year 1947 this Department also set up a Rat Control program.

April 1, 1948

MICHAEL J. NESTOR, M.D.
Superintendent of Health

PRELIMINARY REPORT OF HEALTH DEPARTMENT STATISTICS PROVIDENCE • RHODE ISLAND 1947

	1947	1946	1945		1947	1946	1945
VITAL STATISTICS				DIPHTHERIA IMMUNIZATION			
Deaths all	3270	3173	3158	No. Schick Tests	7879	7217	7084
Deaths under 1	281	269	227	No. Alum Toxoid Treat.	4538	4394	4715
Deaths over 70	1246	1157	1120	SMALLPOX IMMUNIZATION			
Births	11190	10215	8232	No. Vaccinated	1684	2208	2512
Marriages	3525	3903	2814	INSPECTORS			
Infant Mortality	25.11	26.33	27.57	<i>Food Inspector:</i>			
Death Rate	12.29	11.92	11.91	Inspections	7190	9041	8687
Birth Rate	42.06	38.40	31.06	Licenses Renewed	1940	1917	1779
PRINCIPAL CAUSES				New Licenses	215	210	92
1. Heart Disease	1143	1054	1082	Transfers	177	150	131
2. Cancer	486	484	446	Licenses Withdrawn	2	0	1
3. Pneumonia	106	108	115	Licenses Not Approved	17	5	0
4. Nephritis	179	182	188	Lunch Cart Licenses	3		
5. Cerebral Hemorrhage	201	216	224	<i>Sanitary Division:</i>			
6. Auto Accidents	40	49	41	No. of Visits	6795	6225	7524
MILK DEPARTMENT				Animal Bite Visits	1816	1461	1248
No. Samples Tested	17686	16873	22373	Kennel Lic. Approved	39	36	78
No. Licenses Issued	1464	1389	1329	Garbage Lic. Approved	19	12	21
PHYSICIANS				NURSING VISITS			
No. Visits to Sick Poor	309	986	1788	Communicable Diseases	6775	6288	4626
				Parochial Schools	3890	4662	3200
				Tuberculosis—Home	9022	7466	4958

COMMUNICABLE DISEASES

C A S E S

* D E A T H S *

	1 9 4 7				1 9 4 6				1 9 4 7				1 9 4 6			
	Res.	Non-Res.	Res.	Non-Res.	Res.	Non-Res.	Res.	Non-Res.	Res.	Non-Res.	Res.	Non-Res.	Res.	Non-Res.	Res.	Non-Res.
Diphtheria	18	9	11	10	2	2	0	1	2	2	0	1	2	2	0	1
Scarlet Fever	176	78	186	56	0	0	0	0	0	0	0	0	0	0	0	0
Measles	2951	62	1079	14	1	1	0	0	1	1	0	0	0	0	0	0
Whooping Cough	842	38	1097	26	0	0	2	1	0	0	2	1	0	0	2	1
Pulmonary Tuberculosis	223		180		43	12	51	8	43	12	51	8	43	12	51	8
Septic Sore Throat	3	0	1	0	1	0	0	0	1	0	0	0	1	0	0	0
Strep Sore Throat	8	0	36	3	0	0	1	1	0	0	1	1	0	0	1	1
Gastro Enteritis	39	23	26	14	0	0	5	2	0	0	5	2	0	0	5	2
Bacillary Dysentery	7	0	7	0	6	4	0	0	6	4	0	0	6	4	0	0
Poliomyelitis	46	79	9	79	0	4	0	5	0	4	0	5	0	4	0	5
Epidemic Meningitis	7	11	12	17	1	2	3	4	1	2	3	4	1	2	3	4
Typhoid Fever	3	1	0	1	0	1	0	0	0	1	0	0	0	1	0	0
Paratyphoid Fever	3	3	3	3	0	1	0	0	0	1	0	0	0	1	0	0
Epidemic Encephalitis	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0
Undulant Fever	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0
Infectious Mononucleosis	9	2	4	1	0	0	0	0	0	0	0	0	0	0	0	0
Trachinosis	5	4	12	7	0	0	0	0	0	0	0	0	0	0	0	0
Tetanus	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0

*Includes Non-Residents

MICHAEL J. NESTOR, M.D.

Supintendent of Health

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